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PITTSBURGH,
PENNSYLVANIA.

NOVEMBER 1903.

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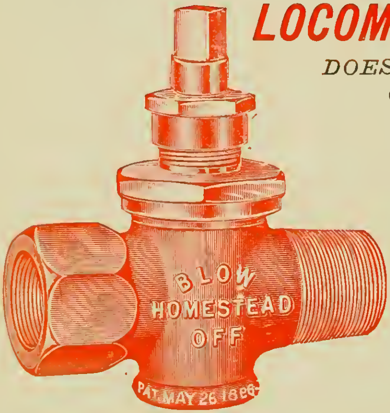

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Classified Index of Advertisements

Air Brakes—
Westinghouse Air Brake Co............ ix

Air Compressors—
Chicago Pneumatic Tool Co.......... xiii
Manning, Maxwell & Moore............ xv

Babbit Metal—
Damascus Bronze Co., Inside front cover
Lawrenceville Bronze Co.,.............. xi
Magnus Metal Co.,.................. vi

Belting—
J. D. McIlwain & Co.,...................... x
Hukill-Hunter Co.,.......................... xvi

Boiler Washers and Testers—
Nathan Manufacturing Co.,............ iv

Boiler Lagging—
Franklin Manufacturing Co............ xv

Boiler Tubes—
National Tube Co.,..................... v

Bolsters—
Pressed Steel Car Co.,......................
Outside back cover

Brass and Bronze Castings—
Damascus Bronze Co.,......................
Inside front cover
Lawrenceville Bronze Co.,.............. xi
Magnus Metal Co.,............................ vi

Brake Shoes—
American Brake Shoe & Foundry Co. ii
Hukill-Hunter Co.,............................ xvi

Car Couplers—
Gould Coupler Co.,........................... ii
McConway & Torley Co.,.................. xi
National Malleable Castings Co.,...... vi

Car Heating and Lighting—
Gold Car Heating Co.,...................... vi
Safety Car Heating and Lighting Co. xiii

Castings—Malleable Iron—
National Malleable Castings Co.,...... vi

Coal and Coke—
Washington Coal and Coke Co.,....... xii

Conveying Machinery—
J. D. McIlwain & Co.,...................... x
Manning, Maxwell & Moore............ xv

Corner Bands—
Pressed Steel Car Co.,......................
Outside back cover

Drills—Twist—
Cleveland Twist Drill Co.,................
Inside back cover

Friction Draft Gear—
Westinghouse Air Brake Co.,........... ix

Graphite—
Jos. Dixon Crucible Co..................... vi

Hoisting Engines—
J. D. McIlwain & Co.,...................... x

Hose Clamps—
J. D. McIlwain & Co.,...................... x

Injectors—
Nathan Manufacturing Co.,............ iv

Jacks—
J. D. McIlwain & Co.,...................... x
Hukill-Hunter Co............................ xvi

Journal Bearings—
Damascus Bronze Co.,.....................
Inside front cover
Lawrenceville Bronze Co.,....... xi
Magnus Metal Co.,........................... vi

Locomotives—
American Locomotive Co.............. xiv

Lubricators—
J. D. McIlwain & Co.,........ x
Nathan Manufacturing Co.,............ iv

Machine Tools—
Niles Tool Works,............................ xii
Manning, Maxwell & Moore............ xv

Magazines—
Railway Age................................ iii

Malleable Iron—
Fort Pitt Malleable and Grey
Iron Co...xvii

Oils—
Galena Signal Oil Co.......... xvii

Oil Cups—
Nathan Manufacturing Co.,............ iv

Packing—
J. D. McIlwain & Co.,...................... x
Franklin Manufacturing Co.,.......... xv

Paints—
Sherwin—Williams Co.,.................. ii
The Lowe Brothers Co.,.................. xvi
M. B. Suydam Co.,............ i

Paint Machines—
J. D. McIlwain & Co.,...................... x

Pipe and Pipe Fittings—
National Tube Co.,.......................... v

Pipe Joint Paste and Compound—
Jos. Dixon Crucible Co.................... vi

Pneumatic Tools—
Chicago Pneumatic Tool Co,.......... xiii
Manning, Maxwell & Moore............ xv

Pulleys—
J. D. McIlwain & Co.,...................... x
Hukill-Hunter Co.,.......................... xvi

Reamers—
Cleveland Twist Drill Co.,................
Inside back cover

Rubber Goods—
Peerless Rubber Mfg. Co.,.............. xvi
Hukill Hunter Co.,................ xvi

Safe Ends for Boiler Tubes—
National Tube Co.,.......................... v

Index—Continued.

Side Stakes—
Pressed Steel Car Co.,.... .... Outside back cover

Spring Buffer Blocks—
Gould Coupler Co.,...... ii

Stay Bolt Iron—
B. M. Jones & Co........................... ivx
Sligo Iron & Steel Co.................. xviii

Stake Pockets—
Pressed Steel Car Co.,.................... Outside back cover

Stay-Bolt Taps—
Cleveland Twist Drill Co.,.............. Inside back cover

Steam Fire Extinguishers for Locomotives—
Nathan Manufacturing Co.,........... iv

Steel Tires—
Latrobe Steel Co.,........................... iv

Steel Tired Wheels—
Railway Steel Spring Co... xiii

Springs—
Railway Steel Spring Co........ xiii

Steel Cars—
Pressed Steel Car Co.,..................... Outside back cover

Steel—Mushet's—
B. M. Jones & Co.......................... xiv

Tools—
Cleveland Twist Drill Co.,.............. Inside back cover

Trucks and Truck Frames—
Pressed Steel Car Co.,...................... Outside back cover

Valves—
Homestead Valve Mfg. Co...... iv

Varnishes—
Sherwin-Williams Co., ... ii

Weldless Steel Flanges—
Latrobe Steel Co.,........................... iv

Wheels—
National Car Wheel Co.,................ Inside back cover

Wooden Cars—
Pressed Steel Car Co.,..................... Outside back cover

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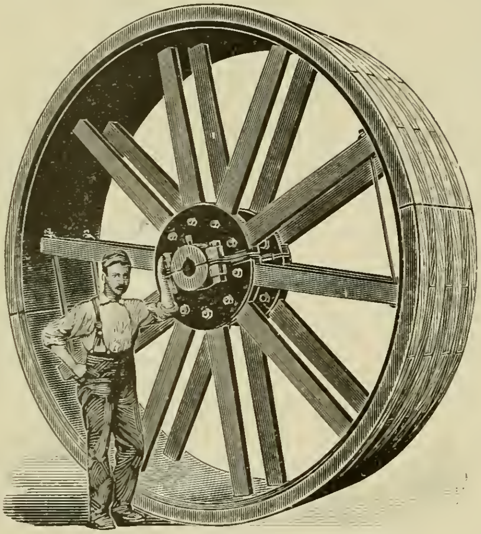

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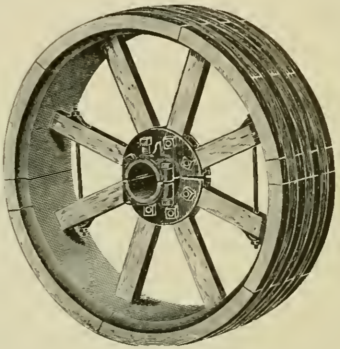

OFFICIAL PROCEEDINGS

of the

Railway Club *of* Pittsburgh.

ORGANIZED OCTOBER 18, 1901.

OFFICERS, 1903 - 1904.

President,
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Supt. Motive Power, P. & L. E. R. R., Pittsburgh, Pa.

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M. M., Bflo., Roch. & Pgh R. R. Co.,
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J. D. Conway,
Chief Clerk, Supt. M. P., General Offices P. & L. E. R. R., Pittsburgh, Pa.

Executive Committee,

E. M. HERR,
Gen'l Manager Westinghouse Air Brake Co.,
Pittsburgh, Pa.

C. L. GIST,
Superintendent Transportation, P. & L. E. R. R., General Offices,
Pittsburgh, Pa.

F. H. STARK,
Superintendent Rolling Stock, Pittsburgh Coal Company, Coraopolis, Pa.

Vol. III.
No. 1.
Pittsburgh, Pa., November 27, 1903.
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Published monthly, except June, July and August, by the Railway Club of Pittsburgh,
J. D. Conway, Secretary, General Offices P. & L. E. R. R., Pittsburgh, Pa.

Meetings held fourth Friday each month, except June, July and August.

PROCEEDINGS OF MEETING,
NOVEMBER 27, 1903,

The meeting was called to order at 8 o'clock P. M., at the Hotel Henry, with President L. H. Turner in the chair.

The following gentlemen registered:

MEMBERS.

Blest, M. C.
Carson, G. E.
Clarke, H. P.
Conway, J. D.
Courtney, D. C.
Dow, G. N.
Dyer, Jos.
Gies, Geo. E.
Gist, Chas. L.
Haring, Ellsworth.
Hood, Charles
Holbrook, D. O.
Howe, D. M.
Huyett, E. Gaither
Hyndman, F. T.
Jefferson, E. Z.
Kelly, Moore
Kessler, D. D.
Knight, E. A.
Lafferty, H. C.
Lee, L. A.
Lindstrom, Chas. A.
Lininger, E. W.
Lininger, Wm.
Long, R. M.
Macoubray, R. J.
Malloy, M. A.
Milliken, I. H.
McCaslin, A. W.
McIlwain, J. D.
Partington, Jas.
Pelletier, Louis
Porter, H. V.
Proven, Jno.
Quest, W. O.
Redding, D. J.
Richardson, W. P.
Scheck, H. G.
Schuchman, F.
Simmons, W. M.
Smith, J. D.
Stark, F. H.
Stratton, G. W.
Sweeley, G. P.
Tesseyman, J. E.
Turner, L. H.
Winlo, R. C.
Wright, R. V.
Wright, Wm.

VISITORS.

Blake, H. B.
Fox, Frank E.
Hess, R. M.
Johnson, Jno. F.
Madden, Wm. E.
Reese, F. T.
Reeve, F. J.
Smith, Sion B.
Taylor, W. E.

The minutes of the last meeting having been printed, the reading of them was dispensed with.

Secretary J. D. Conway read the following list of names proposed for membership:

E. G. Huyett, Chief Estimator, Standard Steel Car Co., Frick Building, Pittsburgh, Pa.

Kilburn D. Clark, Representing the Omega Steel Co., Park Building, Pittsburgh, Pa.

John G. Sanborn, Representing Damascus Brake Beam Co., Fisher Building, Chicago, Ill.

Sherman S. Lawson, Draftsman, American Locomotive Co., Allegheny, Pa.

John Cooper, Shop Engineer, American Locomotive Co., Allegheny, Pa.

O. S. Decker, General Sales Agent, Sligo Iron & Steel Co., Pittsburgh, Pa.

Antes Snyder, Engineer of Right of Way, P. R. R. Co., Room 102, Union Station, Pittsburgh, Pa.

Clarence P. Day, Eastern Manager, Railway Review, 140 Nassau street, New York, N. Y.

Ellsworth Haring, Representing Hermann Boker & Co., 684-A Hancock street, Brooklyn, N. Y.

F. V. McMullin, Mechanical Draftsman, 612 Hamilton Building, Pittsburgh, Pa.

H. A. Cox, Resident Manager, Milwaukee Electric Co., 504 Frick Building, Pittsburgh, Pa.

J. C. Herman, Estimating Department, Standard Steel Car Co., Frick Building, Pittsburgh, Pa.

W. E. Madden, M. P. Clerk, P. V. &. C. Ry., 32d and Carson streets, Pittsburgh, Pa.

President Turner: After these names have been favorably passed upon by the Executive Committee these gentlemen will become members of the Club.

Under the head of new business, I would like to present for your consideration the matter of appointing a Standing Committee on Interchange Rules and Prices. The great advance in cost of materials and labor has created a condition which in making repairs to foreign cars the cost is oftentimes greater than we are permitted to bill for. I would suggest that we have a committee appointed, which shall consist of one active car man from each railroad running into Pittsburg to be selected by the head of the mechanical department of the road he represents. This would enable him to work with the full sympathy and encouragement of his company.

I have talked with the heads of the mechanical departments of some of the roads, and they all look with favor upon the idea. It is thought the labor of a committee of this type, giving a number of months to this work will be appreciated by the Arbitration Committee and should carry some weight. Generally speaking, Club reports are made up hurriedly and do not bear marks of the careful attention the subject deserves. The chair would like to hear from the members, and if it meets with your approval, a motion authorizing the appointment of such a committee, will be entertained.

Mr. F. H. Stark: In order to get the matter before the Club, I move that the president be authorized to appoint a standing committee as outlined, this committee to make their report, I presume, at the May meeting.

President: Mr. Carson, you have had some recent experience that should enable you to say something of interest on the subject.

Mr. G. E. Carson: In looking over the Master Car Builders price list of car repairs, I find quite a number of prices that do not seem just to the parties making the repairs. I do not want it understood that I am criticising or standing in opposition to the able body of men of which the M. C. B. Association is composed, but when we have rules for making car repairs too much time cannot be spent on them, and they should, as near as possible, be brought to a state of perfection. I believe the prices shown in the rules are based on an average cost, and so far as the Company with which I am connected is concerned, we find many of the prices very reasonable and many of them unreasonable. For this reason, I am in favor of having a Committee appointed to go over the rules thoroughly and present any objections which we may have.

President: Mr. Stark, you are actively engaged in car work, what have you to say as to the neeessity of it?

Mr. Stark: Without any reflection whatever on the Master Car Builders Association, I think we are justified in having a standing committee, because there are new features coming up all the time that will require investigation. In fact the M. C. B. Association will not be able to act intelligentJy unless they get information through some such source as this. We are aware that the matter of streel car repairs is a matter that is presenting itself to us and it will have to be worked out. And it is only through the men who are actively engaged in that work that the M. C. B. Association will be able to ascertain just what the conditions are.

Of course, as Mr. Carson says, the M. C. B. prices are made up on an average. We can hardly expect to get in this locality a differential rate or anything different from what they have in every other locality. However the discrepancies ought to be pointed out and rectified where it will not work to the disadvantage of another territory. There is no question that in our present piece work prices they are not applicable to all types of cars. There are many prices that will answer very well for cars of certain construction but are not applicable at all to cars of certain other forms of construction. That is a matter that will be hard to overcome, but as the years go on, and all the railroads are building cars of a heavier type, they will naturally become more and more nearly of a standard and prices will accordingly average up better.

The Western Railway Club always appoints a Committee on Revision of the Rules, and they usually do that early in the season. While I believe they do not call it a standing committee, I think there will be better results if the committee is appointed as a permanent committee.

President: It should not be understood that we desire to criticise the work of the Arbitration Committee. The fact of the matter is that conditions are changing so rapidly that it is absolutely necessary to make some changes in rules and prices; slight changes are made each year, but there seems to be a greater necessity for it this year than ever before.

Mr. Carson. I believe the M. C. B. Association have at the present time a Committee looking into, and preparing a price list covering repairs to steel cars, and I would be in favor of this Committee taking up the same piece of work, as I do not know of a locality in this country where more steel cars are repaired than in the vicinity of Pittsburg, and a price list prepared by the Railway Club of Pittsburg, may be of much assistance to the M. C. B. Committee.

The motion, being put to vote, was duly carried, and it was so ordered.

President: There being no further business to come before the meeting, the paper of the evening on "The Essentials of a Modern Railway Paint Shop" will be read by Mr. W. O. Quest.

THE ESSENTIALS OF A MODERN RAILWAY PAINT SHOP.

BY W. O. QUEST, MASTER PAINTER, P. & L. E. R. R. CO.

The twentieth century is truly a wonderful railway age. As seeming betterments we have the merging of the great railway financial interests. We have the benficial influence of the modern railway club and technical association, zealously fostered by the progressive railway official. We also have the especially devoted railway publication, which is the many tongued voice and beacon light of that world of interested people. We have the palatial million dollar railway depot and a worldwide noted, cultured, traveling public, ever willing to pay for the best of railroad comforts and accommodations. To cater to this exacting class of pleasure loving people, the railway company must ever be on the alert, with the newest novelties in the way of the fast locomotive and modern passenger equipment. To take care of this vast equipment interest, involves large expenditures of time and money.

In our favorite journal we read accounts of the great modern railway shop plants that are being erected all over the country;

how the A. B. C. and X. Y. Z. companies are installing a group of shops as good as brains can devise and money buy, and in a friendly way are vying with each other for the supremacy points in completeness. We also read the valuable opinions and view the photographed details of the specially designed machinery, illustrating the many particular fads and kinks of our country's most noted mechanical engineers, also of the recognized railway shop experts, a class of men always seeking and working in the unexplored territories for progressive knowledge, which, when found, is usually imparted to the railway reading world in able mechanical papers.

As a part of these new shop systems comes the advent of the modernly proportioned, arranged and equipped car and locomotive paint shop, which, in some long neglected localities, are hailed as a twentieth century innovation, and as such, are creating a great deal of interest among the readers of the car painting fraternity.

The installation of the new era railway paint shop, we judge to be synonymous with the coming of the almost wonderfully beautiful passenger equipment of to-day, which, as a matter of greatest economy, requires the greatest of care. This betterment of rolling stock, which is almost general, seems to have evolved a more liberal paint shop policy, especially liberal where compared with the almost drastic economy measures practiced in the past, which, with few exceptions, were to the effect that the paint shop was a good place to originate all shop retrenchment, also that some old building not fit for other use was good enough to convert into a car paint shop. It is a matter of history that there has existed a limited class of hard headed, old time shop officials, whose policy was such as to make one believe they thought a locomotive or passenger car should be painted like a fence or barn, and that a shop with a sky roof was good enough for the purpose. Modern times seemingly has obliterated all such characters. The conservative man of to-day is fully aware that it takes a dollar to catch a dollar and, as a consequence, the painting and maintaining of railway equipment has been stimulated to the extent that there is a demand for better paint shops, better materials, better work, better facilities and appliances, and—last, but not least—that the foreman of painters be also an up-to-date betterment, that he may be equal to the demands of modern time and conditions.

THE ESSENTIALS OF A PAINT SHOP LOCATION.

The matter of locating a car paint shop is, in our estimation, one of much moment. It should be so placed as to obviate all unnecessary handling of unfinished work, from fact that the practice of transferring passenger cars, which are undergoing paint repairs, about a shop yard, can be very readily attended with bad after results, caused by half dried coatings coming in contact with flying smoke-stack water, soot, coal and cinder dust, also the greasy, dirty hand of yard help, or the knock of the careless, or the touch of the inquisitive fellow always in evidence about large plants, who will, regardless of signs, surreptitiously leave his trademark in ascertaining whether or not the applied coatings of paint and varnish are dry enough to be fool proof.

In grouping the shops, the car building and painting departments should be as close together as possible, from the fact that there is much of the priming and surfacing work that can be brought up in building shop, which, if located at to great distance, involves the expense of much lost time in having men travel back and forth in the many coating operations. The location should also be such as to avoid all unnecessary vibratory motion, such as the running of heavy machinery, or train service, or other concussive elements calculated to keep the finer particles of shop dust in circulation, much to the detriment of clean work, especially the clean applied varnish, which is usually much sought for by the ambitious foreman, who is delighted when his shop environments are such as to permit him to produce that beautiful interior polished finish, always so critically admired by the cultured mind and eye.

THE ESSENTIAL CAPACITY OF A RAILWAY PAINT SHOP

would be, in our estimation, a shop large enough to monthly accommodate ten per cent of the company's passenger equipment, as a shop of this capacity would permit the entire equipment to remain in service during the busy passenger traffic season of midsummer months, which is a shopping system that we have been given to understand affords very satisfactory results to railways having somewhat similar shopping schedules. In anticipation to the question as to what we would do with the car painting force during the unemployed months, we would answsr by saying tha we would employ the time and force in rushing the rapidly increasing caboose and freight equipment through the shops and repair yards. Such systematizing of freight car repairs would result in having all equipment which is to be repaired in good condition for the busy fall and winter freight traffic. As viewed from a car painter's standpoint, the chief advantage of such freight shopping system would be that the best of results could be expected from both labor and paint applied out of doors in the good drying weather.

THE NATURAL LIGHT ESSENTIALS OF THE RAILWAY PAINT SHOP, should be that of a steady volume of natural light radiated into shop, the amount being equal to if not greater than any kindred department shop in the group. The light should be so distributed as to cast as little shadow reflection as possible, also to shed a uniform light over the entire interior, regardless of number of cars standing in shop. A controlled sunshine should be invited into building through an ample skylight, and as much side and end wall glass sections as would insure at least sixty per cent of glass openings. In order to shed a low floor line light, all shop window sills should have a line elevation not to exceed thirty-six inches above floor line of shop. As a mechanical help to both natural and electric light radiation, the paint shop interior should be white coated—white paint for the whole interior preferred—but, in any event, that the ceiling should invariably be coated with a good honest white lead paint, used to insure against all flaking up and falling down, a trouble that inevitably occurs where the water mixed gypsum (sulphate of lime) or common whitewash (carbonate of lime) coatings are applied on the usual dressed lumber surface of a modern shop ceiling, which, we presume, is caused by the alternating atmospheric changes in heat, cold and moisture, which is said to cause this class of white coating to lime and disintegrate, especially where used on ceiling.

The essentials of heating and ventilating a railway paint shop according to requirements, should be so mathematically adjusted as to conform to interior shop space in such a manner as to prevent these opposite elements from conflicting with shop cleanliness. A controlled volume of circulated air should be secured through a series of easily manipulated ventilator openings located in the ceiling, or other similar mechanical appliance that will insure a fresh air supply, and at the same time prevent the generated heat from being carried away from work line of shop. Without question, all heat should be either generated or discharged at a low floor line, in order that all moisture resulting from car washing, etc., will quickly dry up. Piped dry steam and hot water, the re-circulating system of hot air, for heating the car paint shop, all have their interested and enthusiastic advocates. According to the available practical authority, the installation of the recirculating system of hot air heating and ventilating, the shop should be so constructed as to insure a fifty to sixty per cent foul air displacement in a given time, as it is claimed that the constant churning over of foul air of a paint shop, without taking in at least fifty per cent of fresh air hourly from outside, will be productive of bad results in the form of both moisture and a poisonous gaseous air, which are extremely injurious to both fresh applied paint and varnish and to the health of the men compelled to work under such conditions. There is an inevitable law that all heat ascends and never descends only when in such volume as to entirely displace the pure air, showing conclusively that all heat should be generated as near floor line as possible, which will, with necessary top ventilation, produce an ideal shop atmosphere on an old established law which, when put to the test, usually shows that it is the most practical, and not the most scientific of heating and ventilating system that is wanted in the railway car paint shop.

As time and labor saving essentials, regardless of first cost, the following facility appliances and tools should be installed in the railway paint shop.

First.—That the entire machinery painting department, regardless of capacity, be equipped with a light, strongly built stationary, quick adjustable scaffolding, which is, as a shop convenience and labor saving device, hard to equal, especially where compared with the old time scaffolding system, which includes the old cumbersome antiquated trestle and plank.

Second.—That an ample compressed air supply be delivered at such shop and yard points as will insure greatest labor economy in its manipulation.

Third.—That the tool equipment includes an up-to-date pneumatic atomizing paint machine, which on class work, regardless of all craft prejudice and opposition, is one of the greatest time and labor saving devices ever introduced into the railway car and locomotive paint shop.

Fourth.—That the tool equipment includes a modern sandblast machine, operated by compressed air, which is a full two hundred per cent labor saving investment, especially where compared with hand labor cost in cleaning the iron and steel parts of the locomotive. A labor saving factor that can also be relied upon in figuring up the future paint maintenance problem of the modern steel car.

Fifth.—That the railway car painting department be fully equipped with a modern glass etching, mirroring and embossing plant, to economize and better facilitate the maintenance of the coach lavatory mirror, the acid cut deck light and silver embossed gothic; also for the etching of the brass sign and for the cutting out of the shop standard zinc plate freight car stencil.

The main essentials of a railway paint shop call for a foreman always on the alert in keeping abreast of a modern times. He should not only be master of his calling, but of himself, also have the executive ability to control men under his charge, who, as a rule, soon learn that if the welfare of the shop is to be made a mutual success, they must respect the authority of their foreman, held for general results,—but who are also quick to discover the weak places in his character, which if not corrected will soon destroy his usefulness as a foreman. To fit the requirements of a general railway paint shop, the foreman should be ever courteous and never overstep the bounds of reason in his dealing with his kindred fellow employees, who, perhaps, through not knowing the extent of his material worries, damage some unfinished work, which, when done, can never be remedied by any amount of growling on part of the foreman. He should be ever ready to consult with his superiors on labor and material matters, which never should be shrouded in craft mystery from the fact that there are no trade secrets that will warrant any such arbitrary action.

As the conclusive essential to paint department's success, the official management should see that the foreman's position is the co-equal of all kindred departments. He should have full control of his department, hire and dismiss his men when such action is warranted. If his efficiency will not warrant the full confidence of superiors as an executive and craftsman, another man should be put in his place, but never over him while acting as foreman. In all instances the official should see that there is no superficial bossing in the paint shop by the class of foremen who still cling to the old antiquated practice, when the opportunity is afforded, to continue this sort of nagging interference. The painter should be firmly fixed in his position, which can be done without the least curtailment in power of the official, who, if up-to-date, knows he is simply transferring the authority to where it belongs, thus providing the chief essential—namely, the recognized brains which operate the Modern Railway Car and Locomotive Paint Shop.

Mr. G. N. Dow: I would just like to ask whether Mr. Quest's paper is founded on ideals or on experience.

President: It is founded on experience. And in discussing the paper, I want to say that Mr. Quest has come here prepared to answer questions, and he will be disappointed if you do not extract all the information from him. The paper is now open for discussion.

Mr. Quest: I would like to say that I have had shop ideals all my trade-working life, and I am just now entering on the realization of one of those ideals, for I believe we are having a first-class paint shop coming on at the Lake Erie works at McKees Rocks.

President: Mr. Stratton, will you give us your experience on the subject?

Mr. George W. Stratton: In reading this paper, which was forwarded to us before the meeting, and in listening to it to-night, one is led to believe that it is ideal; that if we could have such conditions as he expresses we could do splendid work. But I presume he has had experience similar to many others who have done their painting on the run, so to speak. For instance, a car or locomotive may be required to be done in a week, no matter what kind of a week—and the painting has to be done as the machine moves along. I have found that that is very much the way with locomotive painting, so that some of the finer processes are pretty much eliminated, such as striping and two coats of varnish, and all those refinements which we have enjoyed in the past. It is within my recollection that when a locomotive was repaired —and it did not make much difference how much time was taken—when it was done it went into the hands of the painters and they began to put on their multitudinous colors, fillers and stripes, etc., and when they got a good surface, the boss would sit down and paint pictures upon the large wheel covers that used to come between the main and back drivers. And I remember seeing, in war times, a beautiful locomotive with a picture of Point of Rocks in Virginia, and Harper's Ferry, on opposite wheel covers, and the panels of the cab beautifully decorated. And when the locomotive was done, which was not a matter of very definite time, it would go out and be a thing of beauty. Nowadays, when a locomotive has to go into the shop and be repaired and turned out again in two weeks, you have to step down from that high estate.

But with the engines nowadays, my experience being more with engines, no matter what kind of a finish you get, it does not show long. The "wiper" we used to have is a rare member of the railroad fraternity. And when the engine is ready to come into the shop again, it is pretty well covered with something very foreign to paint.

In regard to this equipment you speak of, the sand blast and washing with acids, etc., it seems to me they are fast passing away. I remember when we used sand stones and emery stones, etc., and the best we could do in endeavoring to remove the blue and brown oxide from the steel plates was of little account. But when we began to use paints that experience taught us would stick, these methods were not necessary. And in the experience at Altoona shops, when we were using these paint eradicators, of all tenders going into the shop, 90 per cent. of the cisterns would have to be completely scraped, and the cracked and blistered paint taken off by thorough cleaning and scraping. At the present time not five per cent. of the tenders require scraping because of any cracking or blistering.

In regard to the modern paint shop, I believe that we would all like to have it arranged so that we would get only

Northern light, and then having a sort of saw-tooth roof and no direct light it would be ideal. I have known where sunlight coming into a window and striking a cistern would blister it; also where a blast of hot air from an over-heated heating system would blister the paint—and the man who happened to work just where the air struck would suffer from the hot blast. But this matter of filler and surfacer, with which I presume all of us have had a great deal of experience, has so developed that with us there is less than five per cent. of the tenders that come in that require the cistern to be scraped.

Lead is one of the best materials to put on and will last without cracking when we do not have the opportunity of putting on much varnish. We used to think two or more coats of varnish would protect the paint, but now we find that the paint will stick with one coat of varnish—glad to get that on without having water or smoke spoil it.

Mr. Quest: Did I understand Mr. Stratton to say that the sand blast was not efficient in eradicating old paint, rust or scale, and that the idea is a past method for the purpose of cleaning iron and steel plate? In reply to the gentleman, I would like to submit for your inspection the following work brought with me for the occasion.

Here is a piece of steel plate, with a 12-inch square of it cleaned by hand with broken emery in four minutes, here is another plate of the same size and condition cleaned by the sand blast in 30 seconds; here is also a large piece of old tank iron with years of old paint accumulation on it, from a square foot of which we have thoroughly removed all paint, flash, scale and rust in 55 seconds, leaving an ideal surface to receive paint.

Mr. Stratton: Probably I should not have said that it would not do it; what I meant to say is that there is no use in doing it. Probably it is within the recollection of some of you that when we used to sharpen files with a sand blast, holding the files between two tubes it did not leave the teeth as good as originally, but it sharpened the file. That is, if you would hold it between the sand blasts and let it cut a sufficient length of time, it would sharpen the teeth and if you would hold it there long enough, it would bore a hole clear through the file. The same is the case in engraving a design on glass. If you turn the sand blast on any metal it will cut it away, and it will remove anything that is on it. But what I say is, that it is labor lost. If we get on the right meterials, they will stick and not crack nor blister, and not need scraping off after a year or more of service. I just intended to say that there is no need now of such preliminary preparations for painting.

President Turner: Mr. Dow, you have recently moved into one of the largest and one of the best paint shops in the country. Will you say what is to prevent reaching the ideal conditions as represented by Mr. Quest?

Mr. G. N. Dow: I think Mr. Quest is on the right track. I think he has the right idea of an ideal shop, and if carried out that way he will have one of the best shops in the United States or in the world. His views of heating the shop is superior to the way we heat ours. I think the heat should come from the ground up. Ours is just the reverse it is from the eaves down. I think Mr. Quest is right and you will get better results the way he indicates. And I do not know that I could criticise Mr. Quest on shop lay-out in any way, shape or manner. Of course, others do not know where he got his ideas. I think he got them from our shop. (Laughter.)

Mr. R. V. Wright: Mr. Quest has presented such an able paper and is doubtless so well prepared to back it up that inexperienced in such matters as I am, I would hesitate to criticise anything he says. However, the request was made that we ask any questions we liked in order to draw Mr. Quest out. It is stated on page 5 that the paint shop should be as near the car shop as possible. Now I have always been led to believe that of all the shop buildings fire is more liable to originate in the paint shop than in any of the others, and also that the car shops are liable to take fire without much provocation. It seems to me that this should be modified and instead of saying the paint shop should be placed as near as possible to the car shop; say it should be as near as possible and yet be at such a distance that there will be no danger of fire.

On the same page it is said that the shop should be large enough to accommodate monthly ten per cent. of the passenger equipment. This would indicate that the entire passenger equipment would have to be painted each year. I would like to ask if it is absolutely necessary to revarnish the entire passenger equipment each year.

On the matter of light we are told that the side windows should come as low as 36 inches from the floor. In a shop which is laid out longitudinally the only cars which would benefit by this construction would be those on the tracks nearest the windows, and you would probably get a better light than you need on these cars, whereas the cars along the middle tracks would get no more light than otherwise. It would appear that 36 inches is unnecessarily low.

Concerning the sand blast cleaning. There would seem to be no doubt from what Mr. Quest has shown us that the sand blast machine is a labor-saving device and that a considerable saving can be made by its use. In order to bring out this point more fully I should like to ask whether in a surface cleaned by sand blast and covered with paint, the paint will not endure longer than on one cleaned by hand. It would seem to me that the life of the paint ought to be increased at least fifty per cent.

Mr. Quest: In reply to the gentleman's first question, as to why I want the paint shop and car building shop close together. I stated pretty plainly that it is on account of the distance in traveling to and from; that the arrangement was a matter of convenience, also of economy.

I do not think the matter of greater fire risk should be seriously considered. Of course it is true, that as a rule all authorities, also insurance people, usually blame all paint shop fires, either on carelessness, or on spontaneous combustion, on account of the inflammable nature of materials handled in the business.

As to the 36-inch high window sills, it seems to me that the low window will radiate a lower and more uniform light on the center lines of work, regardless of position. It is true, you have only got the skylight for middle lines of shopped cars. The gentleman may be right on the high window sill, but in my mind it is a matter of doubt. Now, as to sand blast cleaning question, I will say the sand blast leaves the iron and steel surface in a perfect condition for working upon, and that so far as the life of the paint is concerned you can guarantee just twice as much service durability as you can where the surface is not scaled off with the sand blast. If you critically examine the hurried work turned out of the contract shops, where they pay no attention whatever to scale cleaning, you can readily see the difference in a few months time.

Mr. G. W. Stratton: I hope I may not be considered too wordy in this business, but years ago the painting and scaling of paint was a very serious trouble. As I stated, probably 95 per cent. of all the tenders that came in to be painted required the paint to be removed and the painting started from the metal up. Our method for getting rid of the paint was, to fill the cistern with steam, which would heat the metal to such an extent that with a chisel—which was usually a file sharpened to a chisel edge—one could peel the paint off easily, making quite a quick operation. When repainted, it would look very nice in the beginning, but after a while it would crack, and that led us to use the sand blast, and that sort of scouring seemed to improve the surface of the steel or iron. But, as I said, improved methods and materials in this day rendered sand blasts and scraping unnecessary to remove the paint that is on the cistern, in 95 per cent of cases. When cisterns have been scored in places the damaged places can be easily filled with a surfacer and when smoothed up and a few of the finishing coats put on, will look well again. But I think no amount of scouring will make a plate last without cracking, through a period of five or six years.

President: It is the rule over the country to revarnish cars once a year. Cars are taken in because they have lost their lustre, and if not revarnished the body color will suffer. Can anything be done in the way of improved shop facilities or better materials to make these cars last 18 months instead of 12?

Mr. Quest: That would be rather a hard question to answer under present shop conditions. If you could go back to the old times when we used to keep a car in the shop two or three months and use a varnish that would take three days to dry, you might get an 18 or 20 months' average. But to put on what we call an eight-hour free of dirt varnish, you can hardly expect that to last over a year. I suppose it is within the recollection of Mr. Stratton when it took a great deal longer to paint a locomotive than now. Up in Altoona under his administration I remember distinctly when they were surfaced and rubbed out and then taken "up the hill" and brought back after being thoroughly tested before they were finished.

Mr. Stratton: That is right. Time was not an object then.

Mr. Quest: If you have a wearing varnish that will dry slowly you must have more oil in it and less gum. According to varnish makers lore, the more oil the more elasticity, and the more elasticity the longer it will wear. I believe the usual coach and engine wearing varnish of to-day is expected to set free of dust in eight hours or less, which as a rule is very brilliant, also reasonably durable.

Mr. G. N. Dow: I think the car can be kept up with the present varnish by giving it a thorough cleaning once every three months with a good emulsion cleaner. I know it has been proved on several railroads where this practice is in force that a car can be used eighteen months between varnishing. We have had cars run eighteen months and look as well as some cars that were only out eight or ten that have not been cleaned.

Mr. F. H. Stark: I believe that this is a very able paper, and from one not a Painter it would come with very poor grace to do much criticising, or to even ask questions, but there is the question, however, of utilizing the painter force in the summer months on freight cars. Usually the artists in the Coach Shop object to painting freight cars. The force of coach washers might be used to paint freight cars, but there is a certain percentage of coach shop help that could hardly be used on that work. Of course there is a certain amount of baggage and mail equipment that could be run through in the excursion season, and in that way keep the paint shop employed a part of the time. If they would allow us to take cabooses in, and paint and varnish them we could keep the shop busy a great deal longer.

On the question of heat I believe Mr. Quest is on the right road. I was with a road at one time where we had a system of heating with hot air coming down from some twelve or fifteen feet from the floor. It stirred up dust, and did more or less damage. At another place we had steam heat, and it was near the floor and it gave very good satisfaction, and we found that a concrete floor was far better than a wooden floor. The wooden floor absorbed moisture, and kept the room damp, and we found that varnish would dry nearly a day quicker on the concrete floor.

On the question of the sand blast, I think we have good evidence. I remember when we used to plaster the tank with lime and work down the surface with pumice stone, and it was a very laborious and long process; while the sand blast does it better in a very short time.

Mr. Quest: We are cleaning tanks in 6½ and 7 hours in the Lake Erie locomotive painting department. In answer to Mr. Stark on the working force question, I do not think the artists of the shop would object, if they knew they had to lie idle for two or three months otherwise; I think that matter could be managed by employing the skilled labor on the stencilling on of lettering, etc., which could be done on a fair piece price basis, even though you had your shop running on day work the balance of the year.

As for having the heat coming down in shop from ten or twelve feet up, it reminds me of an incident related by an esteemed fellow associate at a recent car Painters' Convention, where the matter of shop heating and ventilating was under general discussion, who in speaking, referred to his experience while in the cold northern country, which was to the effect that one day as they were trying to keep the shop warm, in came an Irishman. He looked around and could not see any stove though he felt the cold draft, and he asked one of the employes of the shop where he could get warm. He said: "Just stand where you are, it is all right. The heat is coming out from up there. That is all the heat we have." He says: "Who got that thing up?" "Why, that is a scientific heating arrangement." "It is, is it? Well, I wish you would call that Mr. Scientific fellow up and ask him why it is my fur cap won't keep my feet warm." (Laughter.)

Mr. G. N. Dow: I would like to state that the Lake Shore is taking to the policy of examining cars that have been out a year. We send a man out and give him the numbers of the cars that have been out twelve months and he examines those cars and reports to the office whether they should be shopped or not, or whether they are good for one or three months' longer service. It takes a man about a week to examine cars on the list.

Mr. Quest: Do you use a painter for that business?

Mr. Dow: He is a car man, but is familiar with paints. A painter is not the right man to send. And oftentimes he finds other defects that require a car to be shopped other than need of varnish.

Mr. G. E. Carson: We are following that system at the present time and we find on one of our divisions that it is out of the question to keep cars in service longer than six months.

Mr. Quest: You refer to the cars recently shopped off the Youghiogheny division, which were brought in and emulsion cleaned, on account of varnished surface being almost entirely obscured by dirt, grease and smoke.

Mr. G. W. Stratton: On the Pennsylvania at one time, there was quite a complaint of varnish not doing well, but it was only an occasional car that was bad. ("I would state that it is the practice of the Pennsylvania to apportion shops to different varnish makers.") Well, we had to look up the samples of varnish, and in the mechanical laboratory they were examined to see how much good copal they might have in them, and the varnishes generally were found to be good. Then a person started out to see what kind of soap they used in washing their cars, and we found that the soap that was used at the points where the cars deteriorated faster, contained quite an amount of uncombined alkali, while the soap used where the varnish lasted better was fully combined or saponified. That led to the making of specifications for soap that there should be less than one-half of one per cent. of uncombined alkali in the soap. And, also a core was taken out of the soap an inch in diameter and two inches long, which had to support a given weight a given length of time, which would prove whether it contained too much water.

Mr. J. D. McIlwain: Do not climatic conditions have a great deal to do with the life of paint?

Mr. Quest: It is generally conceded that climatic conditions does have a great deal to do with it. The material you use here in this section, in all probability would not be fit to use in Arizona, nor would it last long down along the coast, or in the extreme hot and cold sections of our country. I remember distinctly a few years ago we had a series of panel tests, which were gotten up in one section and then sent out all over the country, centrally, East, West, North and South for exposure. At the expiration of two years these panels were called in and examined at a railway car painters' convention, where it was discovered that where the paint did well in some sections, it went all to pieces in other sections, showing conclusively that climatic influence has something to do in the wearing of paint and varnish.

Mr. McIlwain: In cleaning with sand blast, after this cleaning is done, or the scraping or burning off, which takes the longest to complete the tender ready for service afterwards?

Mr. Quest: The sand blast is decidedly the quickest and cheapest cleaning method, but after the cleaning there is practically no difference. We usually require ten days time for a new painted locomotive, but also have a five-day system on the more hurried new work.

Mr. G. E. Gies: Mr. President, at our October meeting there was quite a large number of the members present and it was one of the best meetings this Club ever had, both as to the meeting and the social session afterwards. And to show our appreciation for the entertainment afterwards, I move that this Club extend to the supply men and manufacturing interests a vote of thanks for the special entertainment rendered to the railroad members at last meeting.

The motion, being put to vote, was carried unanimously.

There being no further business, upon motion, the Club adjourned.

Thomas Anderson.

We, the undersigned, Committee appointed to prepare resolutions on the death of Thomas Anderson, a member of the Club, present the following:

Whereas: We learn with sorrow and regret of the death of our friend and member, Thomas Anderson, which occurred at his home in Youngstown, Ohio, on Saturday, October 17th, 1903, after a brief illness, leaving a wife and eight children to mourn his loss. The greater part of his life was spent in the service of different railroads in the positions of Foreman and Master Car Builder, and, prior to going with the Youngstown Car Manufacturing Co., was for a long time connected with the Pittsburg and Western Railway in Allegheny, Pa., as Master Car Builder. He was a member of Logansport, Indiana Lodge of F. & A. M.

Whereas: His life, character, and honorable treatment of all with whom he came in contact was such as to commend itself to all who knew him. Therefore, be it

Resolved: That we extend to his bereaved family our sincere and heartfelt sympathy, and hoping that God in His infinite wisdom will alleviate their grief in this, their great bereavement, and be it further

Resolved: That we place on record our appreciation of his many good qualities which have endeared him to all, and be it further

Resolved: That these resolutions be spread on the Minutes and that a copy of the same be presented to the family.

G. P. SWEELEY,
F. H. STARK, } Committee.
I. N. KALBAUGH.

EDWARD KERR, President. W. R. BROWN, Supt. G. W. GOSSER, Sec'y and Treas.

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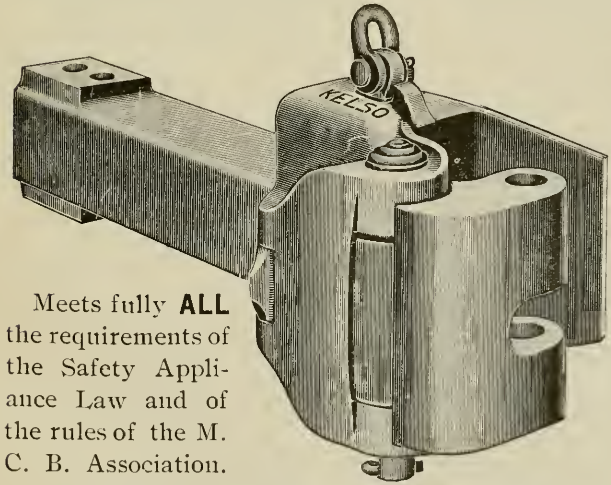

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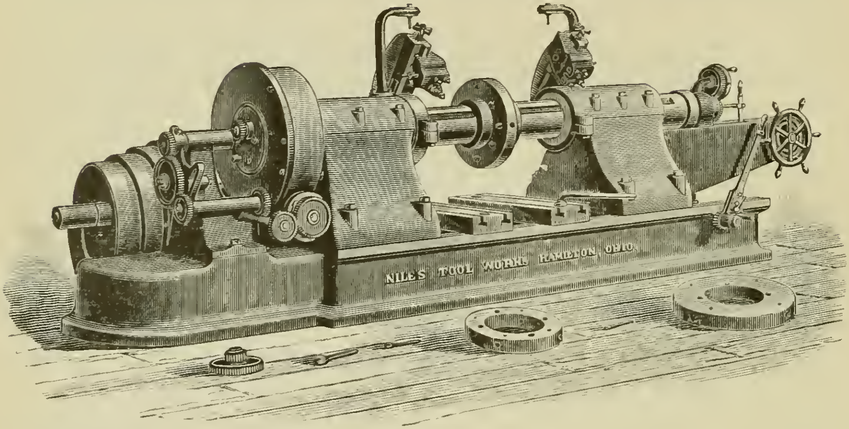
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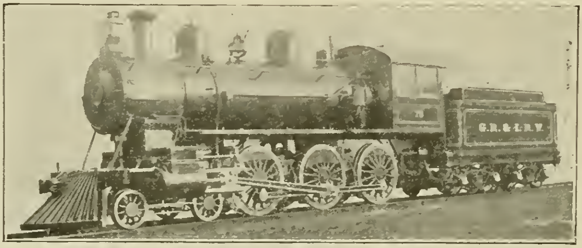

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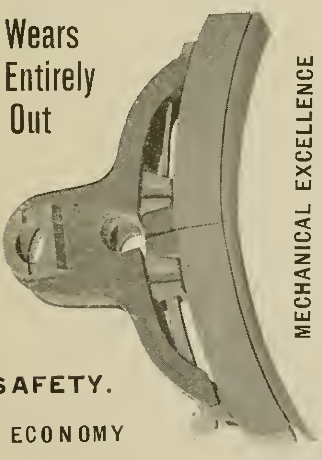

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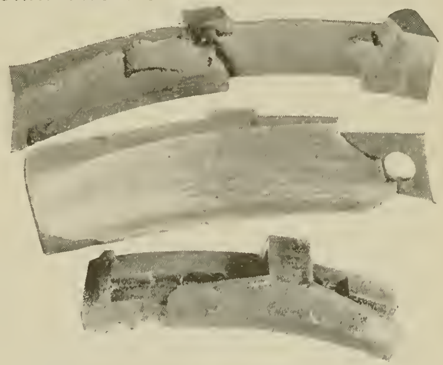

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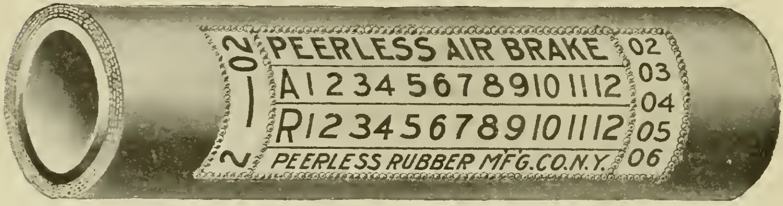
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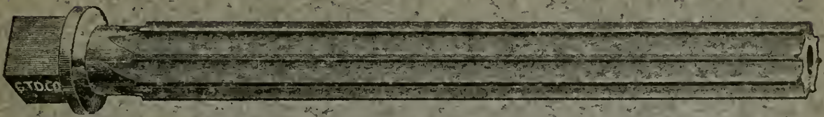

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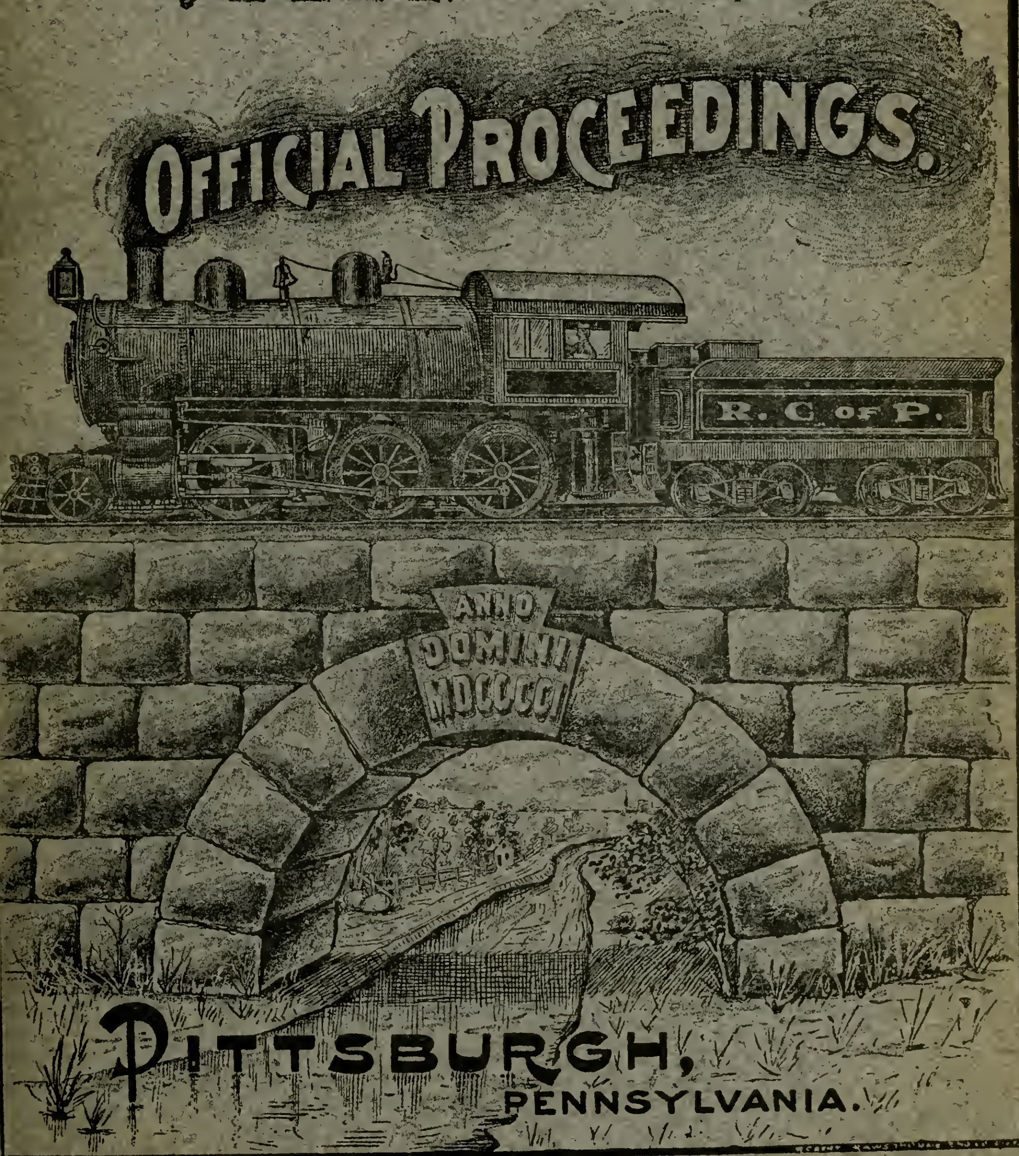

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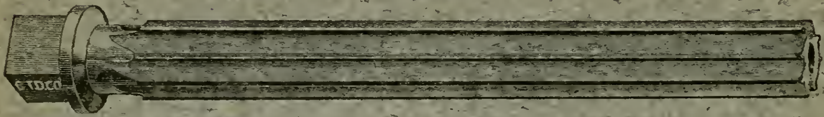

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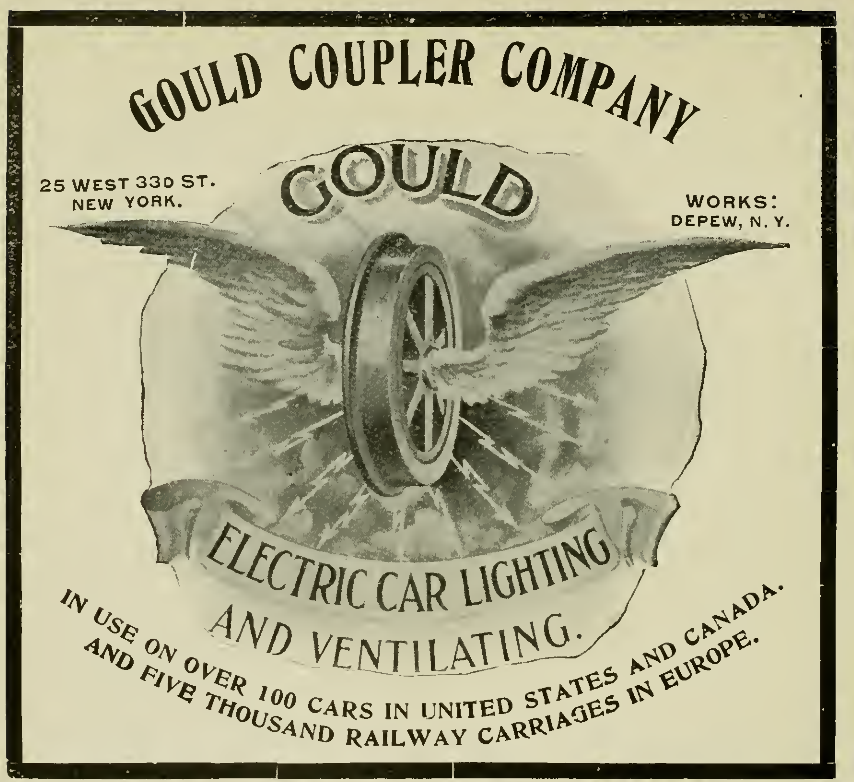

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Classified Index of Advertisements

Air Brakes—
Westinghouse Air Brake Co.......... ix

Air Compressors—
Chicago Pneumatic Tool Co.......... xiii
Manning, Maxwell & Moore.......... xv

Babbit Metal—
Damascus Bronze Co., Inside front cover
Lawrenceville Bronze Co.,.............. xi
Magnus Metal Co.,.................... vi

Belting—
J. D. McIlwain & Co.,...................... x
Hukill-Hunter Co.,......................... xvi

Boiler Washers and Testers—
Nathan Manufacturing Co.,............ iv

Boiler Lagging—
Franklin Manufacturing Co........... xv

Boiler Tubes—
National Tube Co.,...................... v

Bolsters—
Pressed Steel Car Co.,......................
Outside back cover

Brass and Bronze Castings—
Damascus Bronze Co.,....................
Inside front cover
Lawrenceville Bronze Co.,.............. xi
Magnus Metal Co.,......................... vi

Brake Shoes—
American Brake Shoe & Foundry Co. ii
Hukill-Hunter Co.,......................... xvi

Car Couplers—
Gould Coupler Co.,......................... ii
McConway & Torley Co.,................. xi
National Malleable Castings Co.,...... vi

Car Heating and Lighting—
Gold Car Heating Co.,..................... vi
Safety Car Heating and Lighting Co. xiii

Castings—Malleable Iron—
National Malleable Castings Co.,..... vi

Coal and Coke—
Washington Coal and Coke Co.,...... xii

Conveying Machinery—
J. D. McIlwain & Co.,..................... x
Manning, Maxwell & Moore........... xv

Corner Bands—
Pressed Steel Car Co.,.......................
Outside back cover

Drills—Twist—
Cleveland Twist Drill Co.,...............
Inside front cover

Friction Draft Gear—
Westinghouse Air Brake Co.,.......... ix

Graphite—
Jos. Dixon Crucible Co.................... vi

Hoisting Engines—
J. D. McIlwain & Co.,...................... x

Hose Clamps—
J. D. McIlwain & Co.,...................... x

Injectors—
Nathan Manufacturing Co.,............ iv

Jacks—
J. D. McIlwain & Co.,...................... x
Hukill-Hunter Co............................ xvi

Journal Bearings—
Damascus Bronze Co.,....................
Inside front cover
Lawrenceville Bronze Co.,.............. xi
Magnus Metal Co.,......................... vi

Locomotives—
American Locomotive Co.............. xiv

Lubricators—
J. D. McIlwain & Co.,........ x
Nathan Manufacturing Co.,............ iv

Machine Tools—
Niles Tool Works,........................... xii
Manning, Maxwell & Moore.......... xv

Magazines—
Railway Age.................................. iii

Malleable Iron—
Fort Pitt Malleable and Grey Iron Co..xvii

Oils—
Galena Signal Oil Co.......... xvii

Oil Cups—
Nathan Manufacturing Co.,............ iv

Packing—
J. D. McIlwain & Co.,...................... . x
Franklin Manufacturing Co.,.......... xv

Paints—
Sherwin—Williams Co.,.................. ii
The Lowe Brothers Co.,.................. xvi
M. B. Suydam Co. i
Chas. R Long, Jr.......... iii

Paint Machines—
J. D. McIlwain & Co.,...................... x

Pipe and Pipe Fittings—
National Tube Co.,.......................... v

Pipe Joint Paste and Compound—
Jos. Dixon Crucible Co.................... vi

Pneumatic Tools—
Chicago Pneumatic Tool Co,.......... xiii
Manning, Maxwell & Moore........... xv

Pulleys—
J. D. McIlwain & Co.,...................... x
Hukill-Hunter Co.,......................... xvi

Reamers—
Cleveland Twist Drill Co.,...............
Inside front cover

Rubber Goods—
Peerless Rubber Mfg. Co.,.............. xvi
Hukill Hunter Co.,................ xvi

Safe Ends for Boiler Tubes—
National Tube Co.,.......................... v

Index—Continued.

Side Stakes—
Pressed Steel Car Co., ... Outside back cover

Spring Buffer Blocks—
Gould Coupler Co. ii

Stay Bolt Iron—
B. M. Jones & Co. xiv
Sligo Iron & Steel Co. xviii

Stake Pockets—
Pressed Steel Car Co., ... Outside back cover

Stay-Bolt Taps—
Cleveland Twist Drill Co., ... Inside front cover

Steam Fire Extinguishers for Locomotives—
Nathan Manufacturing Co., ... iv

Steel Tires—
Latrobe Steel Co., ... iv

Steel Tired Wheels—
Railway Steel Spring Co... xiii

Springs—
Railway Steel Spring Co......... xiii

Steel Cars—
Pressed Steel Car Co., ... Outside back cover

Steel—Mushet's—
B. M. Jones & Co. xiv

Tools—
Cleveland Twist Drill Co., ... Inside front cover

Trucks and Truck Frames—
Pressed Steel Car Co., ... Outside back cover

Valves—
Homestead Valve Mfg. Co...... iv

Varnishes—
Sherwin-Williams Co., ... ii

Weldless Steel Flanges—
Latrobe Steel Co., ... iv

Wheels—
National Car Wheel Co., ... Inside front cover

Wooden Cars—
Pressed Steel Car Co., ... Outside back cover

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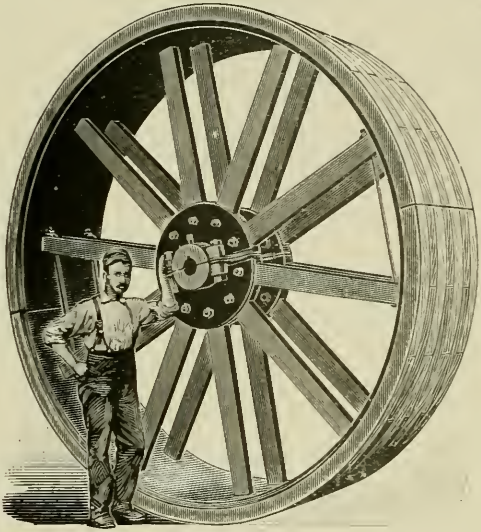

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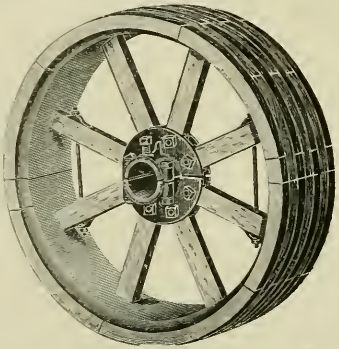

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of the

Railway Club *of* Pittsburgh.

ORGANIZED OCTOBER 18, 1901.

OFFICERS, 1903 - 1904.

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Superintendent Transportation, P. & L. E. R. R., General Offices, Pittsburgh, Pa

F. H. STARK,
Superintendent Rolling Stock, Pittsburgh Coal Company, Coraopolis, Pa.

Vol. III.
No. 2.

Pittsburgh, Pa., December 28, 1903.

$1.00 Per Year
20c. per Copy.

Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, General Offices P. & L. E. R. R., Pittsburgh, Pa.

Meetings held fourth Friday each month, except June, July and August.

PROCEEDINGS OF MEETING, DECEMBER 28th, 1903.

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Carson, G. E.
Conway, J. D.
Courtney, D. C.
Dow, G. N.
Gies, George E.
Herr, E. M.
Hirsch, William L.
Hood, Charles.
Howe, D. M.
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Hunter, H. S.
Huyett, E. Gaither.
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Lawson, Sherman S.
Lee, L. A.
Lindstrom, Charles A.
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Miller, O.
Milliken, I. H.
McFeatters, F. R.
McMullin, F. V.
Oates, George M.
Porter, H. V.
Proven, John.
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Simmons, W. M.
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Wright, William.

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Hughes, J. E.
Jennings, F. R.
Johnson, John F.
Laughlin, C. W.
Lynn, Samuel.
McMullin, Walter G.
Smith, Sion B.
Van Tine, W. H.
Warnock, H. R.

President: The minutes of the last meeting being printed, the reading of them will be dispensed with.

The following proposals for membership were read by Secretary J. D. Conway:

John F. Symington, M. E., The T. H. Symington Co., Calvert Building, Baltimore, Md.

J. B. Hill, Jr., Traffic Manager, American Sewer Pipe Co., Second National Bank Building, Pittsburg, Pa.

C. W. Laughlin, Rep. Manning, Maxwell & Moore, Park Building, Pittsburg, Pa.

Harry R. Warnock. Foreman, P. & L. E. R. R. Co., Glassport, Pa.

J. E. Hughes, Yard Master, P. & L. E. R. R. Co., Glassport, Pa.

H. H. Sproat, Yard Master, P. & L. E. R. R. Co., McKeesport, Pa.

Samuel Poster, Superintendent, L. I. & S. Co., Esplen, Pittsburg, Pa.

Samuel Lynn, Foreman, Pass. Cars, P. & L. E. R. R., Pittsburgh, Pa.

F. T. Reese, M. E., Standard Steel Car Co., Frick Building, Pittsburg, Pa.

Lawrence W. Frank, Secretary, Duquesne Steel Foundry Company.

Secretary: At our last meeting this Club took action directing our President to appoint a standing committee to make suggestions for the revision of the Master Car Builders' Rules. This committee was to report annually at the April meeting of the Club, and at that meeting we were to discuss the recommendations made by the committee, and the recommendations then to be referred to the Arbitration Committee. The President has appointed as that committee the following gentlemen:

F. H. Stark, Sup't Machinery, Pittsburgh Coal Co.

R. L. Kleine, General Car Inspector, Pittsburgh Division, Pennsylvania Railroad Company.

J. P. Yergy, General Car Inspector, Buffalo & Allegheny Division, Pennsylvania Railroad Company.

W. J. Buchanan, Assistant Master Car Builder, Bessemer & Lake Erie Railroad Company.

George N. Dow, Master Car Builder, Lake Shore & Michigan Southern Railway Company.

J. B. Swann, General Foreman Car Department, Southwest System Pennsylvania Lines West of Pittsburgh.

G. E. Carson, General Foreman Car Department, Pittsburgh & Lake Erie Railroad Company.

S. A. Cromwell, General Foreman Car Department, Baltimore & Ohio Railroad Company.

President: The paper for the evening on "Pneumatic Tools and Compressed Air for General Railroad Work," written by Mr. W. P. Pressinger, Manager Air Compressor Department of the Chicago Pneumatic Tool Co., will be read by Mr. H. S. Hunter, also of the Chicago Pneumatic Tool Co., Mr. Pressinger not being able to be here to-night.

PNEUMATIC TOOLS AND COMPRESSED AIR FOR GENERAL RAILROAD WORK.

BY W. P. PRESSINGER.

MANAGER AIR COMPRESSOR DEPT., CHICAGO PNEUMATIC TOOL CO.

In offering this paper upon the subject before the meeting to-night it is not the intention to enter into a detailed description of the various pneumatic appliances used in railroad shops so extensively as to be familiar to you all, but rather to refer briefly to some of the latest forms of these devices, and to present particularly some special appliances that have come to the notice of the writer, which are not in general use. It is also desired to invite a discussion that will doubtless be productive of information regarding other special appliances along similar lines, which some of those present may bring to our notice.

The Pneumatic Hammer is, of course, the most widely used and best known Pneumatic Appliance in shop service, employed for chipping, caulking, beading flues and riveting.

Averaging 10 to 13 pounds in weight and operating at a speed of 1100 to 2000 blows per minute, it may be readily calculated how powerful an agent this tool becomes in the hands of a competent operator, and competence is readily acquired by an ordinary grade of labor, a peculiarly advantageous feature applicable to all air tools. The value of the hammer as a saver of time and labor is so universally conceded that the time has passed where it is deemed necessary to submit comparative figures, especially as much depends upon the conditions of operation and the efficiency of the air plant; but we may say briefly that one man with a Pneumatic Hammer, in chipping, etc., will do as much as three to four men working by hand. A ⅜-inch chip has been removed by one of these hammers from a boiler plate ½ inch thick at the rate of 7 inches in 48 seconds. In addition to the clipping of metals, calking of seams and joints, the Hammer is naturally utilized for a wide variety of purposes requiring a rapid percussive blow, from the dentist's mallet to the driving of drift bolts. Among special uses for the hammer of particular interest to railroads may be mentioned the driving of spikes, and removing scale from locomotive crown sheets. For spike-driving the ordinary long stroke Riveting Hammer held by the hand is provided, with a set suited to the spike head; but for the removal of scale from crown sheets the hammer (or jam riveter, as it is technically called in this instance), is adjusted between grate and crown sheet by means of a pipe extension, and in the stationary position so provided quickly performs the work by the rapid succession of blows which it strikes. In riveting, on a standard fire box leg containing 253-¾-inch rivets, a long stroke hammer will drive all of them in nine hours, at a cost of 48 cents per hour, or a total for the entire fire box of $4.32. This same job by hand work will take fifteen hours, at a cost of 73 cents per hour, or a total for the entire job by hand of $10.95; or if the same job was done by hand-snapping the rivets, it would take twelve hours at a cost of 63 cents per hour, or a total cost of $7.56. Thus you will see a saving can be made on this particular job of $6.63 over the hand-driven rivets, or $3.23 over the hand-snapped rivets. In another instance, 1¼-inch rivets were driven in a boiler which stood 360 pounds pressure, with a Pneumatic Hand Hammer, at about one-third the cost of hand methods. For riveting on outside bridge erection and repair work the Pneumatic Hammer has performed wonders in the saving of time and expense, as following quotations from a report submited to the Asociation of Railway Superintendents of Bridge and Buildings will evidence:

"With Pneumatic Riveting Hammers two men and one heater can average daily (10 hours) 500 rivets; whereas, by hand, 250 rivets per day was a good day's work (more often less) for three men and one heater. One day 700 rivets were driven by using an additional man to take out fitting-up bolts, etc. This was the work of one air hammer only. In inspecting rivets the work is far superior to hand work—less loose rivets,heads invariably perfect, shank of rivet filling hole, and in every way far superior to hand work; also work can be done readily in places where great difficulty has been experienced with hand tools. It seems useless to call attention to the benefit of reamed holes in assembling joints made by Pneumatic Drills over the "drift pin work," so much in use, where hand riveting prevails; but with the rapidity that air drills run, the expense of reaming rivet holes has been reduced to a minimum. Hand riveters only were used in field work on bridges, not over ⅞-inch diameter rivets being driven, the hand riveters being considered more economical than yoke riveters. In handling larger rivets, repairing or rebuilding work done in yards or shops, a yoke riveter could be worked to good advantage. In field work there were many difficulties when doing hand work that would cause delays that are now overcome quickly by use of air. In chipping, cutting out, reaming, drilling, etc., work can be done in a fraction of the time that it used to take, and when done you have a good, presentable piece of work; in fact, Pneumatic Tools are so far ahead and superior to hand work in everything that it is practicaly unnecessary to dilate their uses. It costs the same to spur out at bridge site, as is always done when running a hand gang, and by increasing pipe line you can invariably find a good location for the outfit cars with small expense. In putting in staging or false work for riveters you will find the cost is less, and by doing the work faster by air enables slow orders, or delays to movements of trains, to be reduced, and the slowing up or stopping of a train is an item of expense to railway companies. Men with Pneumatic Riveter will average 500 rivets per day for $8.12, or per hundred, $1.62 1-5. Men with hand power average 250 rivets per day for $9.20, or per hundred, $3.68. The above figures demonstrate that it costs more than double to drive rivets by hand than by using Pneumatic Tools. Another point is that when you have a compressor outfit, when rebuilding old bridges, by putting in a sand blast you are able to eradicate all rust spots that you find in all cases on old iron, which it is practically impossible to do by hand. This leaves iron in perfect condition to receive paint, and you then know that the rust spots have not been hidden under a coat of paint."

"As stated before, this quotation is taken from a report submitted to the Association of Railway Superintendents of Bridges and Buildings at a meeting held, I believe, in St. Louis, two years ago. This, of course, does not correctly represent present conditions, to some extent. I think they can do better now."

In track surfacing, supplanting the laborious and often unsatisfactory proces of tampering, the Pneumatic Hammer has also received successful employment. The tool for this purpose is suitably arranged with a handle enabling the operator in an upright position to readily guide its movements, the air supply being provided from a portable compressing plant with which most roads are now equipped. Tamping concrete, wherever such work is to be done, is performed in an equally advantageous manner.

Reference to the use of compresed air for riveting would not be complete without mention of the air operated oil forge which, by decreasing the time in which rivets may be heated, has assisted in the splendid showing in work done by the riveting hammer. Conveniently connected to the ever-ready air supply, manipulated by a simple controlling valve which regulates to a nicety the proper supply of oil and air, one of these forges in shop work will serve seven to eight rivet gangs as against one of the old-time hand forges for each gang. Compressed air and oil burners are also valuably employed in large furnaces for heating bars prior to being bent into shape by bull-dozers, and for heating the corners of fire boxes for setting up and strengthening bent sheets on steel cars, and for numerous other operations.

The Air Drill, or reamer, next to the percussive hammer, is the most widely known Pneumatic Appliance, and has an extensive range of utility. Almost numberless are the shop operations, the labor and time in performing which have been reduced by this portable compact pneumatic motor, that will fit in almost any space, employing an angle gear if necessary and which is always ready at the instant. Easy to hold and guide, wonderfully lightening arduous tasks, it is not surprising that this tool does not share the customary antipathy of the workman to labor-saving devices. Among special uses for the drill motor is its adaptation as a casting cleaner, portable emery wheel, polisher, driving cylinder boring bars, valve facing machines, motor hoists, operating turntables, jib cranes and elevators.

In the car shops, working in wood, the Pneumatic Drill, running at a higher speed than the one used on metal, and weighing from 10 to 25 pounds, will bore a 2½-inch hole through 5 inches of oak in less than 20 seconds, an excellent record, as all will agree who have ever attempted to bore a 2½-inch hole in oak.

The foreman of car construction of one of the leading railroad shops in the country states that by the use of a Wood Boring Machine his men are able to bore all the holes necessary in the erection of a standard coal car, 192 in number, in fifteen minutes. Allowing three minutes for shifting the air supply from one side of the car to the other, this leaves a net period of 12 minutes for the boring of the holes. This he considers a remarkable performance and so far in advance of hand work as to make comparison out of the question.

"Since this machine has been in use," says our informant, "the shop allowance per car for erection of this type of freight cars has been reduced to $10.00, and without the assistance of this machine my men could not keep within this limit and make fair wages; but with its use, their work being done by piece work, they are enabled to keep within the required amount, and can at the same time make better wages than they formerly did doing the same work on a time basis."

In the car shops compressed air also serves a very useful purpose in operating paint sprayers, paint burners and sand blasts. An air-operated sprayer will paint a standard freight car in 25 to 30 minutes, consuming no perceptibly greater quantity of paint than with a brush. A special device designed by a former railroad official is a combination paint burner and scraper, both operations being performed by the same tool. A tool operated by compressed air for turning car journals and crankpins illustrates the advantage and subsequent saving effected through transporting the tool to the work and not the work to the tool, which, after all, is one of the strongest arguments advanced for the utility of compressed air appliances.

One of the newest Pneumatic Devices with which doubtless many here are not familiar, is the Hydro-Pneumatic Wheel Press, consisting of an air cylinder operated in conjunction with an oil-filled piston carrying tail road, or intensifier, the arrangement affording an unusual effect in power concentration. It is not the intention to enter here into a detailed description of this device, which must be seen to be appreciated; but its value in any form of work and in any position where an extraordinary amount of power must be exerted in a quick operation, is unique. For removing crank pins, or as a punch, or for hoisting, or as a car jack, this machine covers a wide range of usefulness. Occupying less space and working with a considerably less consumption of power, this device represents a marked advance over any form of tool heretofore employed for the purpose. As an instance of the immense power concentration of which this engine is capable, I will mention its application to shears. Employing a 10-inch air driving cylinder with air at 80 pounds pressure per square inch, a pressure of 313,000 pounds was exerted to shear a section of angle iron 6x6x⅝ inches.

Passing from the railroad shop to the foundry we find compressed air employed for chipping and cleaning castings, operating hoists, elevators, casting breakers, sand blasts, moulding machines, sand sifters, sand rammers, etc. The Hydro-Pneumatic machine just refered to may be employed as a hoist in the foundry, eliminating the element of danger in handling vessels of molten metal, and in the actual work of handling patterns and moulds and moving copes will do 50 per cent. more work in a shorter and better manner without the danger of losing castings and with considerable saving in repairs. Cheap labor will perform an incredible amount of casting, chipping and cleaning, and recent inventive development along the line of pneumatic sand rammers, sifters and moulding machines has been remarkable.

Journeying on to the Railroad yard compressed air is found an invaluable agent in the cleaning of seats, cushions, curtains and bedding and for testing air brake equipment. So general has this employment become that all yards of any size are provided with an air installation of such size and cost as would have seemed incredible not a half dozen years ago, and the time is not far distant when all roads will be equipped with a small compressor plant at junction points for the purpose of testing air brake equipment on cars received from foreign roads before resuming their journey.

For pumping water by the air lift method from artesian wells, dug wells and river bed compressed air occupies an established position in raidroad service and the future promises a much wider scope of utility in this class of work. The operation of track sanders, blow-off cocks, and bell ringers are other Railroad uses of compressed air.

Pneumatic tools like all other classes of machinery must receive proper care and lubrication in order to give proper results, therefore, one of the most important factors connected with their care is to keep them clean and well lubricated.

As the air taken into the compressor generally contains some particles of grit and dust, it is almost impossible to prevent this foreign matter from entering into the working parts of the tools, causing the ports to become clogged and rendering them inoperative. The use of a poor grade of heavy bodied oil will also cause the same trouble. A good plan to follow in such cases is to clean by using benzine freely through the throttle handle. This dislodges all foreign matter and cuts the thick oil which can then be removed by blowing the air through the throttle.

It is an excellent plan to submerge the tools occasionally over night in a bath of kerosene and then blow out under pressure the following morning, and lubricating with a good quality of light machine oil which is manufactured especially for use with pneumatic tools. This not only materially assists in prolonging the life of the tool, but it will also be found to give better results.

Where the air is usually laden with foreign matter I would recommend the use of strainers or filters to be attached to the tool or placed in the supply pipe as the case may be.

The care of pneumatic drill motors is the same as with hammers with the exception that a very heavy oil is required for lubrication, preferably a solidified oil, effectually preventing leakages of air that a light oil would not.

It is necessary to remember, that proper efficiency can only be obtained by selecting tools of suitable weight and capacity for each class of work. No tool is adapted for all classes of work. It is not uncommon to find operators attaching blame to a tool on account of its failing to successfully perform its work when the real cause of failure is due to the application of the wrong tool. Therefore it should always be remembered that for a particular class of work a tool should be selected which is designed especially for that work."

This paper would, of course, not be complete without referring to the best known of all uses of compressed air in railroad service, the air brake, which however, may be termed responsible for the development of all other air uses on railroads since it was the air brake pump, always available as a source of power supply, that gave the initiative for the development of these other uses, but the air brake pump as a stationary source of compressed air supply has long since outlived its usefulness. It is gratifying to note the improvement effected in the design and construction of air compressing machinery within the past five years, directly affecting as it does the cost of performing the various operations for which air tools are employed, and to a certain extent the rapid increase in the use of air tools may be traced to the economies effected in transforming steam or electric power into compressed air.

While it is true that the practical use of air tools has been developed to a most remarkable state of efficiency considering the comparatively short time that they have been known and employed, the Compressor end of the proposition, in other words the air supply that furnishes the power to drive the air tools, has been comparatively neglected until recently, especially in railroad shops. We owe much to the railroad shop for this development, because the ever-ready air brake pump was always available without making a requisition, and without installation cost; an air brake pump could be set up and serve for testing any sort of an air tool that might be presented. When the air supply ran short another air brake pump could be added, and then another, until after a time we found railroads where a battery of say ten or fifteen air brake pumps would furnish the power supply for the air tool service at a cost, however, of about five times the steam consumption necessary to operate a modern, up-to-date Compressor furnishing an equivalent capacity. Nevertheless, this question of steam economy was of minor importance because the air brake pump cost nothing, being on hand and available for immediate use, whereas to secure an Air Compressor a requisition must be made, requiring an explanation for the expenditure to higher officials, which did not always succeed in bringing about the purchase. These conditions, however, are changed to-day, and it is realized that a saving of four-fifths of the steam consumption in producing the air supply is worth considering, and it is a very humble shop or power plant indeed that does not boast to-day a modern Compressor.

A question of primary importance in the installation of Pneumatic Tools is to determine the type of Compressor to be used; whether to drive it by direct steam or by belt power, electricity, or water power, if available. Of course water power presents the ideal condition, but for this we must depend upon nature. In many places electricity is preferable where a large power plant generates electricity at a very low cost, but in most cases it is more desirable to have a direct steam-driven Compressor that may be operated overtime, or upon holidays or Sundays, if necessary, without running the rest of the power plant. If electricity is the motive power the question would arise whether it would be most desirable to gear the Compressor, or have it direct connected or drive it by belt power. There are arguments in favor of all these different forms of installation, dependent naturally upon the individual conditions presented. Belt power is not always desirable because of the unusual strains that will come upon the Air Compressor shafting and belts, because an Air Compressor is not an even running machine.

This unevenness of operation is obviated in a duplex Compressor, with cranks at right angles, one side helping the other. Furthermore, the duplex type of construction presents the advantage of an auxiliary machine, as one side of the Compressor may be cut out and operated independently of the other in the event of accident. There is a strong advantage in compound compression in the larger sizes, providing sufficient attention is paid to adequate inter-cooling.

The greatest trouble that has been experienced heretofore in Compressor installations is the tendency to install Compressors of too limited capacity. When air tools were in a more or less experimental stage, not so many years ago, it is not surprising that small Compressors were installed with the eventual result that before long the air supply was too limited. The tendency even to-day in many plants is to have an insufficient air supply, with resulting troubles from reduced pressure, etc. The best advice that can possibly be given in relation to the installation of an Air Compressor is to estimate the full use for air and then double it. Another point that must not be overlooked in the selection of air equipment is not to be guided too strongly by first cost, and provide a machine that is cheap only in price, but to give careful consideration to the weight, general features of design, strength, bearing surfaces, valve area, governor mechanism, etc. Consider all these features further and estimate the power cost per cubic foot of free air per minute delivered under your required pressure; make a thorough calculation as compared to first cost, and eventually you will find that the difference between the cheap Compressor and the good one will earn a handsome interest on an investment basis.

Passing from the Compressor to the Receiver, it is essentially desirable that the Receiver capacity shall be liberal. Receivers are not expensive, and the greater Receiver capacity provided the greater percentage of moisture is eliminated from the compressed air. Receivers are not valuable primarily for storage service, the main purpose being to eliminate pulsations from the air and collect moisture. Separate Receivers are recommended in large plants at the chief points of consumption. Leakages in the air piping must be avoided, as compressed air is most penetrating in its properties, and to insure adequate efficiency air lines must be tight. Frequent tests should be made to determine tightness and locate leaks.

Another very important feature is to have the air pipe lines adequate in size to permit their discharge of compressed air at consumption points without appreciable loss of pressure through friction.

Cooling of the compressed air after compression, or after cooling, as it is termed, is very desirable in many installations.

Reheating of the air before usage also contributes to increased efficiency within proper limitations.

All of these features which enter into the successful installation of compressed air machinery on a higher plane of efficiency have received the careful study and attention of those who have most to do with the increase and extension in the use of compressed air machinery, and much valuable advice and suggestions may be obtained by those interested through a careful investigation of the subject.

President: Gentlemen, this most excellent paper is open for discussion. We have with us to-night a great many men who are actively engaged in the operation of shops where compressed air is used extensively, and we should have a full discussion. Mr. Lindstrom, may we call upon you to open the discussion?

Mr. Charles A. Lindstrom: Mr. President and gentlemen, I wish to say that I received only a day or two ago a letter from our Secretary asking me to say a few words on this subject. but as I had not received the advance copy of the paper, and as I did not have sufficient time to collect any data, I am afraid that I will not be able to advance anything that will be of interest. However, I may say that everything contained in the paper is, as far as I know, true. The use of pneumatic tools has increased to such a great extent during the last few years that when we look back we can hardly see how we got along without them. During the time covering my connection with the Pressed Steel Car Company there has been installed quite a number of air appliances for the purpose of reducing shop cost. One of our plants was fully equipped with pneumatic hammers, whereas the other plant was not. In comparing the cost of production of the two plants, the difference was so greatly in favor of the plant with the pneumatic hammers that there was no chance for argument, and I believe something like sixty hammers were ordered and installed at one time into the plant not previously equipped.

Railroad shops in general are using a great number of pneumatic tools. While I was connected with the Chicago & Alton Railway, we put up large shops with electric and hydraulic power, as well as a great deal of pneumatic power, and we found it to be the very best kind of investment.

Therefore, about all I can say is to fully agree with what has been said in the paper, and that the installation of pneumatic tools is the best investment a shop can make.

President: Mr. Quest, you ought to be able to give us something of interest in regard to the use of compressed air in the paintng of cars.

Mr. W. O. Quest: The only thing I can say in regard to the use of compressed air in painting cars is that I would entirely agree with the paper so far as the utility of the tool is concerned. I can also endorse the time rate he speaks of and the economy of the practice. There is simply no comparison where you would compete hand labor against the machine. I know that in our practice on the P. & L. E. we have painted a coal car in less than 25 minutes. On exhibition we have covered a coal car that had 500 superficial feet in as low as seven minutes. And our lowest speed, on exhibition, for a 100,000 capacity steel car, what we call a "battle ship," was 22 minutes; but our general practice is from 30 to 35 minutes. And in completing that operation we have something like 1,350 feet to go over. I think that speaks well for the pneumatic paint machine.

Mr. D. J. Redding: I agree with all the other gentlemen have said with regard to the remarkable efficiency of compressed air. There is no use in trying to disagree with it. But there is one thing that I have to find fault with, and that is that everybody in presenting a paper of this kind reads off the very best figures obtainable. It is just possible that some man drawing more salary than the ordinary workman can do it, but it is not every-day practice. In riveting a fire box, for instance, the price given is 48c per hour. That would mean to pay the man handling the hammer 20c, the helper for holding on 17c and the rivet heater 11c an hour. I am inclined to think that in the average boiler shop the riveter on fire box work receives more than 20c per hour. In structural work I understand bridge workers now receive 50c an hour, and there are three men in a gang and each one receives 50c, the men taking turns at the driving, heating and holding on; that would make the rate $15 a day instead of $8.12.

Regarding the use of compressed air for oil forges, while I know that good results are obtained, I would consider it rather extravagant for shop use. I read a paper written by Mr. Pressinger a couple of years ago in which he stated that you could lose one horse power of compressed air in five minutes from a 1-16-inch hole. You would at that rate not need a very large hole in your forge to get rid of a lot of air in a short time. I should think in a permanent installation you could use air from a pressure blower at much less expense and with equally good results.

I am not prepared to say that a man cannot drill all these holes in a car in fifteen minutes and carry the machine around to the other side while he rested, but it is a remarkable performance if it is regular practice.

I would also like to ask the speaker if any one has produced a satisfactory strainer where the air is carrying a good deal of foreign matter. All the strainers we ever tried were cut out in a very short time.

I notice there is a good deal of difference of opinion as to the proper location of the reservoir. Mr. Hunter will probably be able to tell us whether a reservoir ought to be in a cold place or a hot place. I would also like to ask him about the use of oil in the pneumatic drills, if he thinks solidified oil for that purpose is along the right line.

Understand, I am not "knocking" against compressed air. We couldn't get along without it; but I think some of the figures are a little bit lower than the average practice.

President Turner: If any one of the gentlemen has had any trouble operating compressed air tools, Mr. Hunter has given this matter his attention for a number of years, and I hope you will not hesitate to question him. Mr. Stucki, let us hear from you.

Mr. A. Stucki: Being connected with steel car works, I am greatly interested in these tools. For riveting, however, we use hydraulic pressure as far as possible. One reason for this is the fact that this way the rivet will fill the holes clear through, while hand-driven rivets, even if heavy sledges are used, will not do so, but will fill the holes only for a limited distance under the heads. Perhaps Mr. Hunter can give me some information of what we can expect from an air hammer in this respect.

I agree with you, gentlemen, that we can paint cars very quickly with air machines—in fact, we use them quite extensively for trucks and such parts of the cars which are hard to get at, but as a rule we do not use them for flat surfaces. By the way, I would like to ask what experience has shown regarding the durability of paint, and whether any specific tests have been made in this respect so as to determine the relative value between the brush coating and the one applied by machine. On wooden cars I have several times noticed that in the latter case a dry skin was formed on top, while a dry mellow powder filled the space between it and the wood. That dry skin comes off very easily, and then very little is left to protect the wood. I hope, however, that such cases are exceptions.

President: Mr. Carson, to what extent do you use compressed air in repairs to freight cars?

G. E. Carson: We use pneumatic hammers and drills on steel car repairs, and certainly would not want to be without them. Their use simplifies and expedites the work to the point where we find it no harder to repair steel cars than wood cars, and our success I believe is due largely to the use of pneumatic tools. On steel car repairs we use three men in a gang, who cut off and renew the defective parts, and when applying floor sheets, side sheets and side stakes, drive at the rate of 48 rivets an hour. I am not prepared to say how many rivets can be driven on straight work, for our work is not such as to enable us to give it a fair trial.

In one part of the paper just read I notice that some car foreman has stated that he is able to bore 192 holes in 15 minutes with a pneumatic wood boring machine. It seems to me that this is wrong information. If not, I would like to know what kind of a machine he used, the size of holes and the thickness of the timber. We, at the present time, are using a pneumatic wood boring machine which is in good condition, and to find out the capacity of the machine we took a piece of 4x4 oak and had a man drive holes as fast as he could without changing his position, and the very best he could do was to drive 66 holes in 15 minutes. Had this man been using the machine on repair work, where it was necessary to change his position from time to time, I do not believe he would average one hole per minute.

President: Mr. Gies, we would like to hear from you.

Mr. George E. Gies: I am like Mr. Lindstrom. I did not get my notice until late. Of course that was not the fault of the Secretary, and I do not see any chance for argument on this matter at all. It is all one-sided, though there may be some discrepancy in regard to the amount of work that has been done in a given time. As Mr. Carson says, and he made a test to-day, what I heard read is not altogether what I thought a man could do. It may be that the man used more than one boring machine, it may be that there were circumstances to alter the case from what we would think true. But as a general statement, I do not see that there is any argument against the use of pneumatic tools. We have quite a number of them in all our shops for different kinds of work, drills, hammers, hoists, etc. We use them for cleaning cars and cleaning cushions and carpets, and for cleaning our machines of shavings in the planing mill. It is a very good thing and we ought to have more of it. Like Mr. Lindstrom, I do not see how we ever got along without them. But I do not understand why we should get a report two years old, as Mr. Hunter says some of this information is. That is too far behind the times. There has been quite a little progress made in this line in the last two years.

President: Mr. Pressinger prepared this paper on very short notice, and I do not believe he had time to hunt up all the up-to-date information. It seems to me the only thing to do is to invite the pneumatic people out to your shops to show you how to do it, and then go ahead and do it every day.

Are there any others who would like to ask any questions or speak on the subject?

Mr. W. O. Quest: I believe it would be in order to answer the question of Mr. Stucki in regard to the difference in the durability of paint—hand applied and machine applied. I believe that our experience at the Lake Erie shops has been sufficient to convince us that there is practically no difference. As to the matter of skin-drying, of which he speaks, that trouble could be occasioned with hand labor the same as with the machine, from the simple fact that the paint was applied too heavy; it was not what would be called "brushed out" sufficiently; if a paint is mixed properly, you can atomize it and apply it with less skill than you can when applying it with the brush, and I believe in painting freight cars—either by brush or machine—the use of unskilled labor is general in most railway shops.

The gentleman says also that they use the pneumatic paint machine mostly on bottoms and trucks, but do not use it on bodies. May I ask whether you do most of your work inside of the shop or outside?

Mr. Stucki: Inside, yes, sir.

Mr. Quest: Usually there is an objection to using the pneumatic paint machine in a shop, especially where you use a mixed craft working force in a shop. And that is the principal trouble encountered. Strictly speaking, if you could confine your machine practically to the paint shop, the men employed would soon get used to it, so there would not be the same general objection. But to take the pneumatic paint machine among carpenters, boiler makers and so on, there is always a certain amount of kicking. Our machine practice is mostly out doors, and where the machine is properly handled and the paint properly tempered for the purpose, there is no reason why a paint machine would not do better work than that done by unskilled labor. I am sure the machine would have the better of it where properly handled. In our general shop practice we go further than using the machine on outside work. We do our passenger car trucks exclusively with the machine. We never use a brush on an all-painted truck. We apply both a varnish color coat and a clear varnish coat with the machine, which, of course, is done in doors. And I would like to invite any gentleman here this evening to come down to our shop and see the operation. We have been spraying our trucks, also all running parts of locomotives for the past three or four years, and I will guarantee that you will not have to roll your pants up in getting around where the work is done—not as much so as where the work is slopped over by the fast or careless workman. That skin-drying trouble the gentleman speaks of on steel cars might happen where you have a paint that oxydizes very rapidly, and if you apply it heavy, it is natural that it will dry on top; it will oxydize on the top and cause the effect mentioned. If you rub or touch such a coating with your finger, or attempt to stencil anything on it before it has dried all the way through, it will skin and pull off. But I assure you that you can have the same effect from the same class of paint where carelessly applied with a brush.

Mr. Stucki: How about applying paint in the winter season?

Mr. Quest: That leads to a question that I would like to ask the gentleman who introduced the subject of the evening. Where you take in your air from the outside, that is from a moist or wintry atmosphere, is it not a fact that you are going to have more or less water or ice to contend with? In the winter we have always had to resort to a strainer to keep the ice from going into the valves of our machine, which is the only thing we could do to keep the machine going. But if we could keep the valves free of ice, we could satisfactorily operate our machine right along. Of course it must be understood that the paint will not dry as quick out of doors in the winter as in the summer months. Now as to the question of Mr. Redding, as to whether the compressed air should not be taken from a warm chamber, hydrated as it were, which in my opinion would be very beneficial, not only to paint machines, but to any other class of pneumatic machinery, whether it be a paint, riveting or boring machine. I would be pleased to have the gentleman say a few words on the matter, as to whether it would not be better to have the air taken from a warm chamber of some kind instead of from outside in moist or cold, freezing weather.

President: I do not know that we need to confine ourselves strictly to Pneumatic Tools. One of our members has recently completed the application of compressed air to passenger cars, for raising and lowering windows.

Mr. Charles Hood, may we hear from you?

Mr. Charles. Hood: Mr. President, Gentlemen—I do not know that I can say very much, as we are rather young yet in the compressed air field. However, I will say that we have a car equipped with our system of automatic windows, as some of you who are here this evening are aware, and, up to the present time, the windows have been giving very satisfactory results.

The windows are operated by small cylinders placed in the stanchion or window frame on each side of the sash and are attached to the sash by pivots. Air is admitted to these cylinders through a suitable valve underneath the window. The air is taken from our own reservoir, which is located under the car and is supplied from the auxiliary reservoir of the brake system by an air line. In this line we place a reducing check valve which reduces the pressure to that required for operating the windows. In the saloon of the car we place what is called a master valve, by which all the windows in the car may be raised, lowered, or locked by the train crew. For example, if there were a number of windows in the car that were raised, the brakeman may, by releasing the master valve, lower them, and if necessary to raise them again may do so by throwing in master valve, which will raise the same windows that were raised before. Passengers can, however, operate their windows separately so long as they are not lowered and locked from the master valve.

The window is so constructed that it is absolutely tight. In the stanchion or frame of window we place a movable strip, convex on the outer edge, which fits into concave in edge of sash. Back of this strip is placed a pneumatic tube inflated with air, which keeps strip forced out into concave of sash, thus making an absolutely tight joint, yet allowing the sash to be free of action.

So far in our tests, as I have said before, we have met with gratifying results. There has seemingly been no room for complaint, and as the car has been in service for a period covering about 30 days, and on account of the unusual severe test it has had to endure, we feel that there is little liability for failure, as the windows have been and are now working very satisfactory.

There having been a question in the minds of some as to the working of the window after a period of 30 days or more, we have with us this evening a couple of our members whom I believe will bear me out when I say that the windows are working better now after being in service a month than when first installed, having worn the bearings smooth, thus working more easily.

Thanking you, Mr. President, for this privilege, I believe this is all I have to say until a further test has been made.

President: If there are no further remarks, Mr. Hunter will reply to the questions that have been asked.

Mr. H. S. Hunter: I will endeavor to answer some of Mr. Redding's questions first. He refers to the figures and data given in this paper of the cost of performing the different work. As I explained, we are not responsible by personal tests for those figures. The tests were made some time ago, say two years ago, and at that time the wages of the average structural iron worker were not nearly as high as they are to-day.

The first item to which he referred was, I think, the cost of driving rivets in fire box leg. Now it was barely possible that those figures were arrived at by having a stationary rivet heating furnace convenient to the man who held on the rivets, and in that way they may possibly have dispensed with the service of a heater. In looking over the figures, that is the only way I can explain them. The cost of driving rivets in bridge construction, however, I think can be cut down considerably to-day below the figures given—not the wages per hour, but the amount of work done in ten hours. The number of rivets that can be driven in structural work, such as heavy plate girders and such work as is commonly done on railway bridges is not excessive. I have known in some cases, as high as 750 rivets to be driven per day, and in one or two cases, 1000 rivets to be driven in a day of ten hours with one hammer. The 1,000 rivets were driven in buckle plates, and of course there was no delay between the rivets. They had two forges heating for one machine. That record might make up for the difference between the wages paid at that time and the wages paid structural iron workers at the present time.

In regard to the cost of operating oil rivet heating forges, the quantity of oil required to keep the forge at a temperature suitable for heating rivets for successful driving, would be about twenty gallons in ten hours; that is, the forge would consume about twenty gallons of ordinary crude oil per day. I do not know just what the price of that grade of oil is, at the present time, but I do not think it is much over $2.00 a barrel of forty gallons.

In regard to the quantity of air required to operate this forge, the majority of oil burners have a reducing valve which reduces the pressure, from eighty or one hundred pounds, or whatever may be carried in the line, to about twenty pounds pressure. It has been found by experiments that from fifteen to twenty pounds is the best pressure at which to burn crude oil economically, that is, the air pressure for atomizing it. That of course would lessen the volume of air that would escape through a 1-16 inch opening. The ordinary fan blower could not be used to advantage, because you cannot get above sixteen ounces pressure, from a fan blower, or I think about seven pounds from a positive blast blower; so you could not carry pressure enough with a fan blower to burn oil to the best advantage.

In regard to the strainers for separating the foreign matter from the air before it passes to the pneumatic tools, we have made some experiments and find that for say, ¾-inch pipe, if we connect a strainer with an area of about twenty square inches, made from about sixty-four mesh wire gauze, it will last quite a long time. Of course if the strainer is no larger in area than the air pipe, it will cut out very rapidly; but by making it in the form of two bell shaped flanges with the gauze between, thus increasing the area, it will last much longer.

In regard to air receivers there seems to be considerable difference in opinion as to where they should be located. Recent experiments along this line have demonstrated the fact, that where there is considerable moisture in the air, or where you are taking air from near the steam exhaust pipe, it is necessary to use more receivers than would be the case where you were getting dryer air. The proper place, to my mind, from which to take air before compression is outside the engine room or at any point where you can get it coldest. The lower the in-take air is in temperature, the more efficient the compressor. If you are bothered with considerable moisture in the air after compression, it would be policy to have a receiver in the engine room or handy to the compressor to overcome the pulsation of the machine, and then distribute auxiliary receivers through the works where the greatest amount of air is taken off. I know of one or two cases in practice, where the air is used for operating switches, that a battery of receivers was installed in order to get rid of the moisture. If you can reduce the air to the temperature of the surrounding atmosphere it would not contain any more moisture than the outside atmosphere, which of course would not interfere with the operation of pneumatic appliances. The temperature of the air after compression, can be successfully reduced by a battery of receivers, passing the air in at the top of the receiver, and taking it out at the opposite side, near the bottom. I also think that one or two deflectors that would cause the current of air to come in contact with the entire inner surface of receiver while passing through, would have an increased tendency to cool it down and precipitate more moisture. It then passes from one receiver to the next in the series until it is finally delivered into the line. Drain cocks should be placed at lowest points in each receiver, or preferably, connections made to an automatic trap.

I will answer Mr. Quest's question while I am on that subject. If you experience very much trouble with the air freezing up in paint spraying machines, I imagine it freezes right at the exhaust. A small re-heater would overcome that trouble. There are some small re-heaters that burn coke. The air is admitted at one side of this heater, which is a sort of portable furnace, and passes through a coil of pipe, immediately over the grate surface, where the coke is burning. It apparently does not take very much fuel to heat the air above the point where it will freeze when discharged. I recall an improvised re-heater used a couple of years ago at the McKees Rocks works of the Pressed Steel Car Company during a cold snap, when otherwise they would have been compelled to suspend temporarily the use of pneumatic tools. This reheater consisted of three or four short sections of 2 inch pipe, connected by return bends through which the air passed. This was placed on top of their rivet-heating furnaces, the waste heat raising the temperature above the freezing point at the exhaust from machines.

In regard to the most suitable oil for pneumatic tools. For pneumatic riveting or chipping hammers a light oil must be used to get the best results, on account of the valve blocks having small parts that will readily clog up with a heavy grade of oil. Directly the opposite is the case with pneumatic drills, because the port area is more liberal and pneumatic drills can take care of a heavier oil. A good grade of winter strained lard oil will insure the best results on pneumatic drills or motors.

I will endeavor to answer Mr. Stucki's question in regard to the difference between the filling of, holes by rivets driven with pneumatic hammers and rivets driven with a sledge. If the pneumatic hammer is handled properly with the blow directly against the end of the rivet on the line of its axis, there is no question but that it will fill the hole better than in driving with hand hammer or sledge. In driving with a sledge workmen are very liable to strike the end of the rivet on the side, and thus mushroom a head on it without filling the hole. It is impossible to do this with a pneumatic hammer if the machine is held squarely on the rivet, and that should be done until the hole is filled, and then rotate it in a way to fill out the head and bring it down in close contact with the plate. It is not all operators of pneumatic tools that will drive a rivet in this way, but it is the proper way, and if they are driven in this way there will be no trouble with loose rivets.

In reference to Mr. Carson's question relating to the number of holes that can be drilled with a pneumatic wood boring machine. I really do not know where the author got this data. If Mr. Carson made that test as he states, of which I have no doubt, he is in better position to determine the number of holes that can be drilled with a portable pneumatic wood boring machine than I am. I will say, however, that a great deal would depend on the speed of the machine. In drilling holes for ⅝-inch bolts, which would be approximately 11-16 inch holes, the drill should run at a high rate of speed. If one machine runs at 800 and another at 1,500 revolutions per minute the machine that runs at 1,500 would quite naturally drill the greater number of holes. I think the figures are right, as they were given us by a man who had apparently made the record, so we had no reason to dispute them at that time.

I believe this answers all the questions that were asked.

President: Mr. Hunter, if you were going to equip a yard for charging trains with from five to eight miles of pipe, and that pipe strung along a half of a mile to two miles from the air compressor, where would you locate your receivers to get a uniform pressure in the pipes.

Mr. Hunter: I would locate the receivers at intervals along the line where the greatest amount of air is to be taken off.

President: If you had only one receiver, where would you put it, at the center or the farther end, or where?

Mr. Hunter: If I were using only one receiver I would place it in the compressor room.

President: I mean one auxiliary receiver.

Mr. Hunter: The far end of the line would be the best place, because that would give you a storage at that end to draw from. If you are taking off the air at three or four points, in order to get a uniform pressure all over the line it would be necessary to locate a receiver at each point.

Mr. D. J. Redding: I would like to say that there must be some mistake in regard to air operated oil furnaces. I know where they are operated with fan blast successfully.

In driving rivets we have found that with the ordinary length we can drive successfully, but in driving rivets 5½ and 6 inches long we do not get as good results with pneumatic hammers as with a sledge. We do not get the rivets tight under the head. Owing to the rapidity of the blows you cannot be sure that the bucking up at the other end is sufficient to give you the full effect of the blow. Where we have driven them through a mud ring with a pneumatic hammer we have found it necessary to caulk a great many heads, and we do not find it necessary to do that where we drive with a sledge.

I would also like to ask for my own information, as well as for the information of a few other people, what in the opinion of a pneumatic tool man would be a fair test, if you were about to install pneumatic tools and every maker in the country was trying to sell you his goods, so that you could decide what tools you wanted, and the salesmen who did not make the sale would be perfectly satisfied that their tools were not as good as the ones which were purchased. (Laughter.)

Mr. Hunter: I would like to ask Mr. Redding for what purpose the oil furnaces were used.

Mr. Redding: Tube fires, welding tubes.

Mr. Hunter: In making the statement that oil furnaces gave the best results with 20 pounds air pressure, I am merely quoting information received from people who make a business of building oil furnaces. It is possible that an oil furnace can be made to work successfully with a fan blast, but the people who make a business of building oil furnaces tell me that you get the best and most economical results at 20 pounds pressure.

In driving mud ring rivets, as Mr. Redding mentions, with pneumatic hammer, I can understand if the holding on is done with the ordinary club dolly bar, as they term it, that would possibly be the result, but I think it could be overcome to a certain extent if you would use a pneumatic holding-on bar or a spring bar of some description that would insure the weight being against the head of the rivet every time the piston of the hammer struck a blow. I have found in driving rivets, when a pneumatic bar can be used to advantage much better results are obtained. This is simply a piston in a cylinder with the air pressure behind the piston, that gives a hammering effect on the head of the rivet, which apparently upsets the stock underneath the head, as well as upsetting the stock on the end being formed by the hammer. Rivets for that class of work should be heated uniformly all over. If anything, the head end should be the hottest. The holding-on bar, if cupped, to suit rivet head, should have positive contact on apex of head and the largest diameter of cup should be greater than the diameter of the rivet head at the same point.

Mr. Redding: He has not answered the most important question yet. (Laughter.)

Mr. Hunter: I must say it is rather difficult for me to answer that question. I hardly think anything short of a year in actual service, under average shop conditions, would be an absolute test. A pneumatic tool is a machine that must be made light to be commercially of any value, and yet must develop a lot of power. In fact I doubt whether there are any pneumatic tools on the market to-day in which some of the parts are not within ten per cent. of their physical limit, that is within ten per cent. of the danger line. The reason I say a year's test would be the only positive test is, it would require that time of service to determine the durability, as machines which appear frail or delicate on examination, might prove the most durable. A mechanical test should be employed to determine the power and the quantity of air used to develop the power. Shop conditions preclude the possibility of a true and positive test being made in any other manner. To those interested I would be pleased to explain in detail a device which I think could be used for this purpose. When you consider the power they are expected to develop, the class of workmen, in some cases, who operate them, I think there is no machine in use in the railroad shop that is subjected to so severe and excessive service as pneumatic tools.

President: If there are no further remarks the discussion will be closed.

Mr. E. M. Herr: We have all been very much entertained and instructed by the paper this evening, and the very courteous and interesting way in which Mr. Hunter has met all the questions that have been asked. I move, therefore, that a vote of thanks be tendered to Messrs. Pressinger and Hunter for the very able paper and its presentation here tonight.

The motion being duly seconded was carried unanimously, and President Turner extended the thanks of the Club verbally to Mr. Hunter and directed the Secretary to communicate the same to Mr. Pressinger.

On motion, adjourned.

EDWARD KERR, President. W. R. BROWN, Supt. G. W. GOSSER, Sec'y and Treas.

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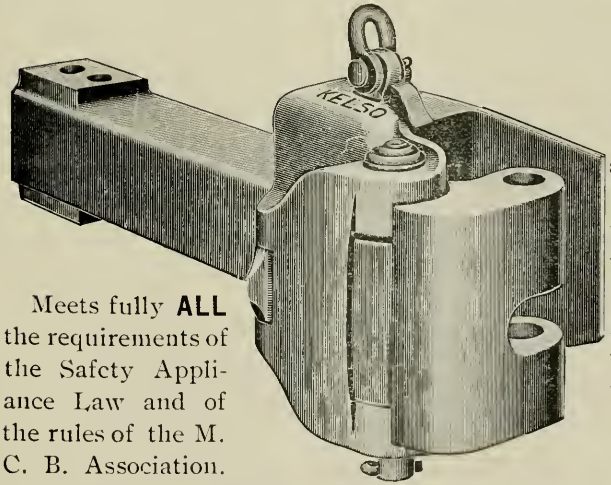

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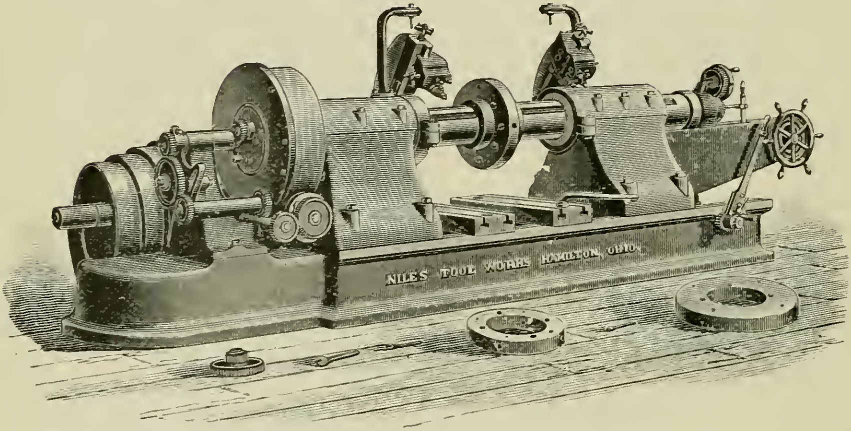
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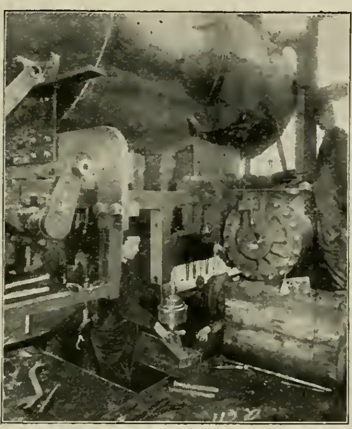

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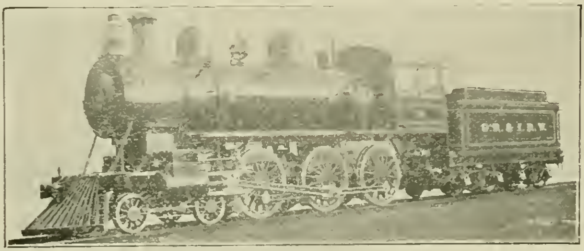

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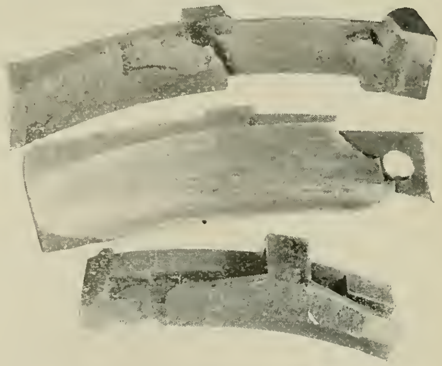

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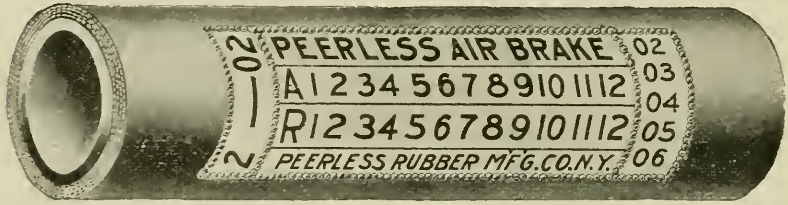

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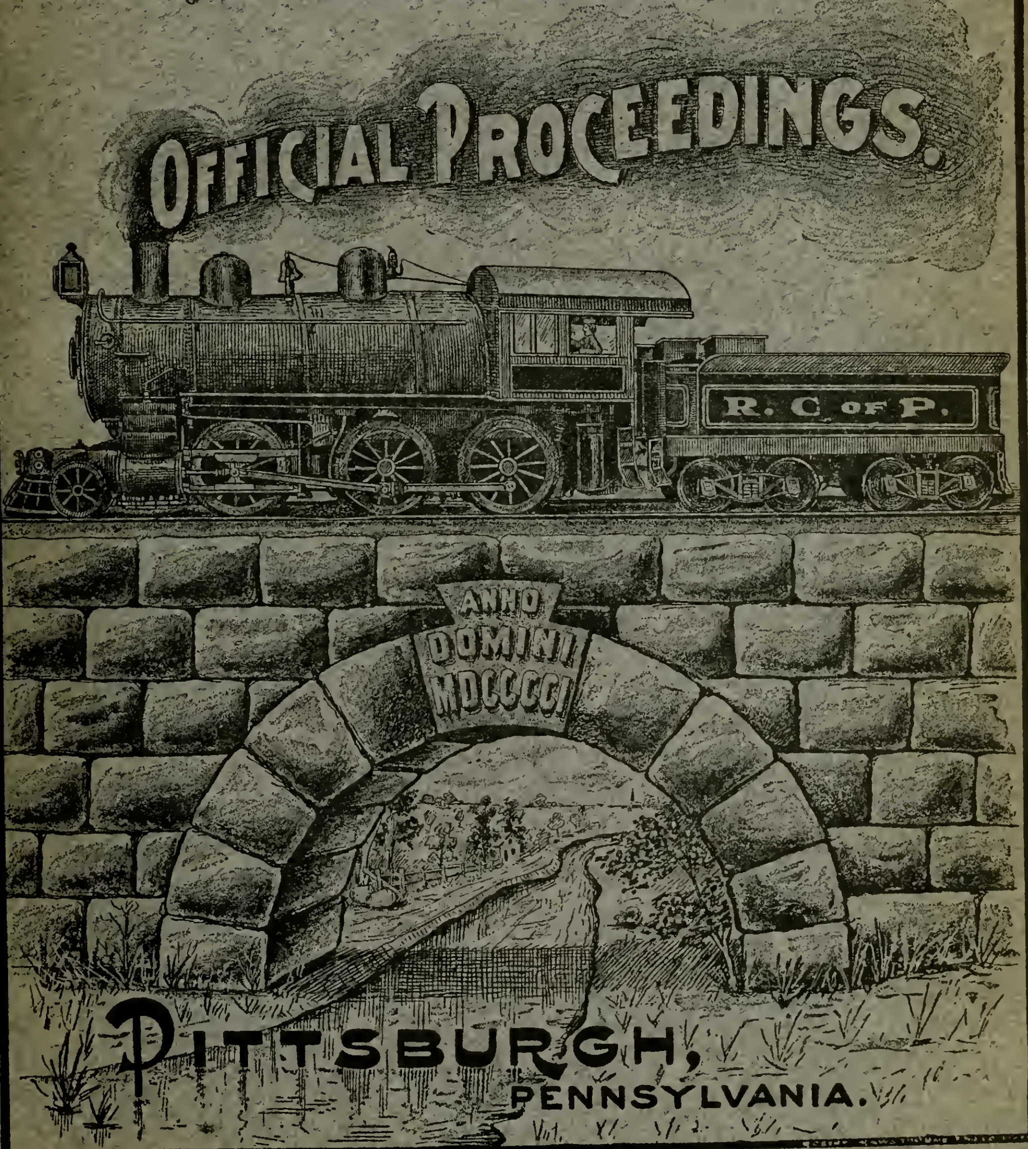

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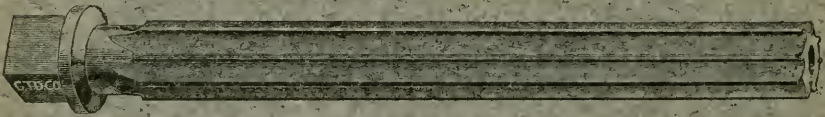

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Classified Index of Advertisements

Air Brakes—
Westinghouse Air Brake Co............. ix

Air Compressors—
Chicago Pneumatic Tool Co.......... xiii
Manning, Maxwell & Moore............ xv

Babbit Metal—
Damascus Bronze Co., Inside front cover
Lawrenceville Bronze Co ,.............. xi
Magnus Metal Co.,......................... vi

Belting—
J. D. McIlwain & Co.,...................... x
Hukill-Hunter Co.,......................... xvi

Boiler Washers and Testers—
Nathan Manufacturing Co.,............ iv

Boiler Lagging—
Franklin Manufacturing Co............ xv

Boiler Tubes—
National Tube Co.,......................... v

Bolsters—
Pressed Steel Car Co.,......................
Outside back cover

Brass and Bronze Castings—
Damascus Bronze Co.,.....................
Inside front cover
Lawrenceville Bronze Co.,............... xi
Magnus Metal Co.,........................... vi

Brake Shoes—
American Brake Shoe & Foundry Co. ii
Hukill-Hunter Co.,.......................... xvi

Car Couplers—
Gould Coupler Co.,........................... ii
McConway & Torley Co.,.................. xi
National Malleable Castings Co.,...... vi

Car Heating and Lighting—
Gold Car Heating Co.,...................... vi
Safety Car Heating and Lighting Co. xiii

Castings—Malleable Iron—
National Malleable Castings Co.,...... vi

Coal and Coke—
Washington Coal and Coke Co.,....... xii

Conveying Machinery—
J. D. McIlwain & Co.,...................... x
Manning, Maxwell & Moore............ xv

Corner Bands—
Pressed Steel Car Co.,......................
Outside back cover

Drills—Twist—
Cleveland Twist Drill Co.,................
Inside front cover

Friction Draft Gear—
Westinghouse Air Brake Co.,........... ix

Graphite—
Jos. Dixon Crucible Co..................... vi

Hoisting Engines—
J. D. McIlwain & Co.,...................... x

Hose Clamps—
J. D. McIlwain & Co.,...................... x

Injectors—
Nathan Manufacturing Co.,............ iv

Jacks—
J. D. McIlwain & Co.,...................... x
Hukill-Hunter Co............................ xvi

Journal Bearings—
Damascus Bronze Co.,.....................
Inside front cover
Lawrenceville Bronze Co.,............... xi
Magnus Metal Co.,........................... vi

Locomotives—
American Locomotive Co............... xiv

Lubricators—
J. D. McIlwain & Co.,...................... x
Nathan Manufacturing Co.,............ iv

Machine Tools—
Niles Tool Works,........................... xii
Manning, Maxwell & Moore............ xv

Magazines—
Railway Age.................................... iii

Malleable Iron—
Fort Pitt Malleable and Grey Iron Co...xvii

Oils—
Galena Signal Oil Co....................... xvii

Oil Cups—
Nathan Manufacturing Co.,............ iv

Packing—
J. D. McIlwain & Co.,...................... x
Franklin Manufacturing Co.,.......... xv

Paints—
Sherwin—Williams Co.,................... ii
The Lowe Brothers Co.,.................. xvi
M. B. Suydam Co. i
Chas. R. Long, Jr............................ iii

Paint Machines—
J. D. McIlwain & Co.,...................... x

Pipe and Pipe Fittings—
National Tube Co.,........................... v

Pipe Joint Paste and Compound—
Jos. Dixon Crucible Co..................... vi

Pneumatic Tools—
Chicago Pneumatic Tool Co,........... xiii
Manning, Maxwell & Moore............ xv

Pulleys—
J. D. McIlwain & Co.,...................... x
Hukill-Hunter Co.,.......................... xvi

Reamers—
Cleveland Twist Drill Co.,................
Inside front cover

Rubber Goods—
Peerless Rubber Mfg. Co.,............... xvi
Hukill Hunter Co.,........................... xvi

Safe Ends for Boiler Tubes—
National Tube Co.,........................... v

Index—Continued.

Side Stakes—
Pressed Steel Car Co., ... Outside back cover

Spring Buffer Blocks—
Gould Coupler Co., ... ii

Stay Bolt Iron—
B. M. Jones & Co. xiv
Sligo Iron & Steel Co. xviii

Stake Pockets—
Pressed Steel Car Co., ... Outside back cover

Stay-Bolt Taps—
Cleveland Twist Drill Co., ... Inside front cover

Steam Fire Extinguishers for Locomotives—
Nathan Manufacturing Co., ... iv

Steel Tires—
Latrobe Steel Co., ... iv

Steel Tired Wheels—
Railway Steel Spring Co. xiii

Springs—
Railway Steel Spring Co. xiii

Steel Cars—
Pressed Steel Car Co., ... Outside back cover

Steel—Mushet's—
B. M. Jones & Co. xiv

Tools—
Cleveland Twist Drill Co., ... Inside front cover

Trucks and Truck Frames—
Pressed Steel Car Co., ... Outside back cover

Valves—
Homestead Valve Mfg. Co. iv

Varnishes—
Sherwin-Williams Co., ... ii

Weldless Steel Flanges—
Latrobe Steel Co., ... iv

Wheels—
National Car Wheel Co., ... Inside front cover

Wooden Cars—
Pressed Steel Car Co., ... Outside back cover

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Friction Draft Gear.

The Westinghouse Friction Draft Gear is a gradually applied and automatically released frictional resistance which absorbs the shocks delivered to train during buffing and pulling operations. . . . .

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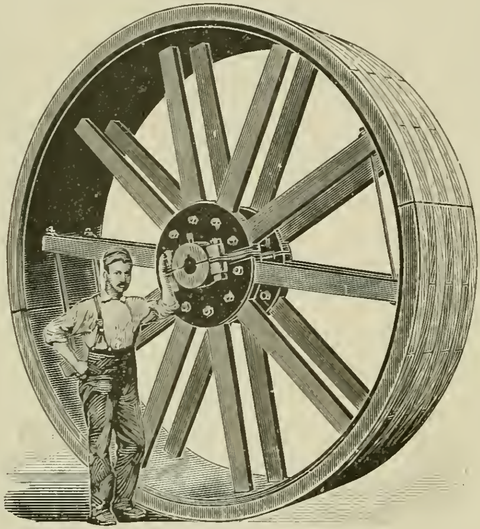

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1. Ease in mounting on shaft.
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6. Every SEGMENT of the rim NAILED and GLUED.
7. Every pulley carefully balanced. Cannot get out of round.
8. Mechanical in construction and appearance
9. Made in all sizes and GUARANTEED FOR ANY POWER.

Heavy Key Seated Pulleys and Main Drives a Specialty.

We also furnish flange, dynamo and loose pulleys, step and taper cones, and all kinds of pulleys of special construction, and will be pleased to quote prices on application.

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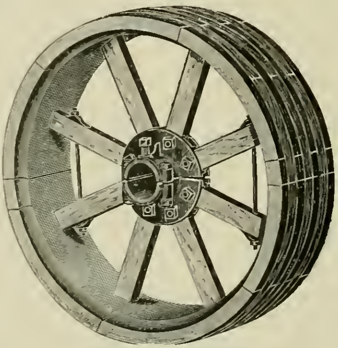

OFFICIAL PROCEEDINGS

of the

Railway Club *of* Pittsburgh.

ORGANIZED OCTOBER 18, 1901.

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Superintendent Transportation, P. & L. E. R. R., General Offices, Pittsburgh, Pa.

F. H. STARK,
Superintendent Rolling Stock, Pittsburgh Coal Company, Coraopolis, Pa.

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No. 3.

Pittsburgh, Pa., January 22, 1904.

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Published monthly, except June, July and August, by the Railway Club of Pittsburgh,
J. D. Conway, Secretary, General Offices P. & L. E. R. R., Pittsburgh, Pa.

Meetings held fourth Friday each month, except June, July and August.

PROCEEDINGS OF MEETING, JANUARY 22nd, 1904.

The meeting was called to order at 8 o'clock P. M., at Hotel Henry, with President L. H. Turner in the chair.

The following gentlemen registered:

MEMBERS.

Anderson, H. T.
Bell, W. K.
Bellows, A. B.
Blackall, Robert H.
Blest, M. C.
Brown, E. W.
Conway, J. D.
Courtney, D. C.
Dyer, Jos.
Ford, D. W.
Herrmann, J. C.
Hunter, H. S.
Huyett, E. G.
Hyde, J. C.
Hyndman, F. T.
Knight, E. A.
Lee, L. A.
Lobez, Pierre L.
Low, Edgar S.
Lynn, Samuel.
Malloy, M. A.
Miller, John F.
Moyer, F. Hughes.
McConnell, J. H.
McIlwain, J. D.
McMahon, W. C.
McMullin, F. V.
Oates, Geo. M.
Reagan, P. J.
Robinson, F. M.
Schauer, A. J.
Scheck, H. G.
Schuchman, F.
Shannon, Charles.
Stark, B. F.
Stucki, A.
Tesseyman, J. E.
Thomas, E. C.
Turner, L. H.
Van Tine, H. C.
Warne, J. C.
Warnock, H. R.
Wright, R. V.

VISITORS.

Anderson, A. E.
Cooper, J. L.
Gordon, C. E.
Halleran, H. J.
Hindman, S. M.
Isbester, G. C.
Smith, Sion B.
Turner, Walter V.
Yohe, J. K.

The minutes of the last meeting being ready to publish, the reading of them is dispensed with.

The Secretary announced the following proposals for membership:

Samuel G. Stafford, Vice President Vulcan Steel Co., Aliquippa, Pa.

W. W. Bumbaugh, President Monessen Foundry and Machine Co., Monessen, Pa.

M. S. Tracy, Asst. M. M. Penna. Lines West of Pittsburgh, Allegheny, Pa.

E. Reese, General Yard Master P. & L. E. R. R. Co., 1017 Wilson avenue, Youngstown, O.

J. W. Mooney, Rep. Ingersoll-Sargent Drill Co., 1515 Park building, Pittsburg.

H. E. Barney, Rep. Manning, Maxwell & Moore, Park building, Pittsburgh, Pa.

Conrad Bollinger, Jr., Manager Ingersoll-Sargent Drill Co., 1515 Park building, Pittsburgh, Pa.

C. E. Gordon, Asst. Storekeeper Penna. Co., 700 Arlington avenue, Allegheny, Pa.

R. A. Bagnell, Prest. Monthly Official Railway List, 116 Nassau street, New York, N. Y.

President: As soon as these names have been favorably passed upon by the Executive Committee these gentlemen will become members.

The subject of the paper for the evening is "Higher Braking Power for Freight Cars," by Mr. Robert H. Blackall, of the Westinghouse Air Brake Company.

HIGHER BRAKING POWER FOR FREIGHT CARS.

BY ROBERT H. BLACKALL, WESTINGHOUSE AIR BRAKE CO.

Some years since, the general character of freight cars, and the conditions of service, were such as led to the decision that 70 per cent. of the light weight of a car, based on a cylinder pressure of 60 pounds, obtained in an emergency application of the brake, could be used as a safe braking power.

This general practice has been in vogue up to the present time, not-with-standing the fact that there have been many modifications in other parts of the equipment, which would permit of the use of a higher braking power, without any greater tendency to produce wheel sliding. The longer and heavier trains now handled, reduce the factor of safety, and any aid that can be obtained in this line is certainly desirable.

Since the time 70 per cent. was established as the proper braking power, the carrying capacity of cars, as compared to their light weights, has materially increased; the larger engines employed permit of a much greater tonnage being handled; the hardness of brake shoes has increased somewhat, thus reducing the co-efficient of friction at slow speeds; the wheel base between truck centers has increased; there has been a very considerable increase in the unbraked weight per wheel; the percentage of braking power to the load has been steadily on the decrease; inside hung brakes are in general use; and 10-inch equipment is now built especially adapted to obtain the proper braking power on heavy cars without making the total leverage too great, a thing which can not be done with the 8-inch equipment, when employed on this class of car. There are many other points which will be brought up to show that the braking power can be safely increased without a corresponding liability of wheel sliding, and that the present conditions demand a more efficient brake, especially for loaded trains of heavy capacity steel cars.

In the following, reasons are presented to show that a greater braking power is much to be desired, that it is a necessity in certain classes of service, and that in view of the many changes in modern equipment there seems to be no doubt but that the braking power can be increased, thus adding greater safety and efficiency, without materially increasing the number of flat wheels.

70 per cent braking power in an emergency application, and this means but 58 1-3 per cent. with a full service application, has given very good results; while it is sufficient to drop a train equipped with well maintained brakes, down a two per cent. grade, at an average schedule speed of 16 miles per hour, there is insufficient reserve power with which to stop if occasion demands. With a few poor brakes in the train the engineer is confronted with a stern proposition, and one that can be very materially improved upon, with decided benefits to all concerned.

Passenger cars are braked at 90 per cent., thus giving 75 per cent. braking power with a full service application. With the many trains using High-Speed Brakes it is possible in making an ordinary station stop or slow-up, to have a cylinder pressure of 60 pounds, which results in a braking power of 90 per cent. with a heavy service application. In local service it is not at all uncommon to hear these reducing valves discharge a small amount of air just as the train is coming to rest, thus showing that the cylinder pressure is slightly above 60 pounds, and yet no complaints are heard of flat wheels in High-Speed Service. This must be accounted for, by the fact that cars are longer, more inside hung brakes are used, there is a greater protecting weight per wheel, owing to the heavier cars in use, and possibly that changes in brake shoe material, have tended to decrease the co-efficient of friction somewhat.

The curves in Fig. 1 show at a glance the braking power obtained, with a 50,000 capacity wooden car from the point where it has no load, up to where it is loaded to 10 per cent. beyond its capacity. The braking power for the service as well as the emergency application is shown, the dotted lines showing the former, and the full lines the latter; the two up-

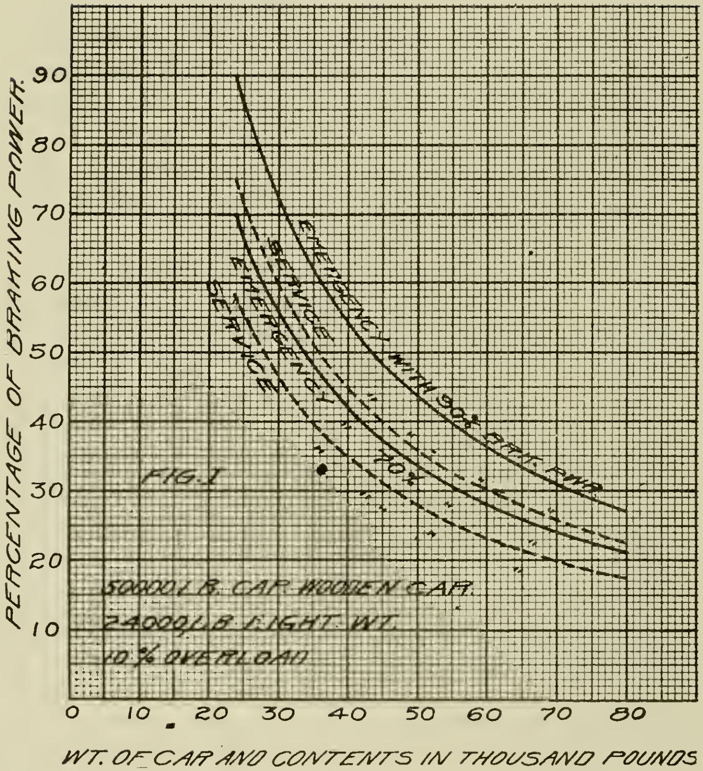

FIG. I

per lines show the resultant braking power with the service and emergency applications, when the braking power is figured at 90 per cent. with a 60-pound cylinder pressure, and the two lower lines show the corresponding percentages of power developed with a braking force figured at 70 per cent.

Fig. 2 shows the corresponding curves for the 100,000-pound capacity steel car.

The weight of the 50,000-pound capacity car is taken as 24,000,and that of the 100,000-pound capacity steel car, as 40,000 pounds, these weights being found in use with these classes of cars. The figures used show the most favorable comparisons, since the weight of the 50,000 pound capacity wooden car is a little below the average, while the weight of the steel car is a little above the present average.

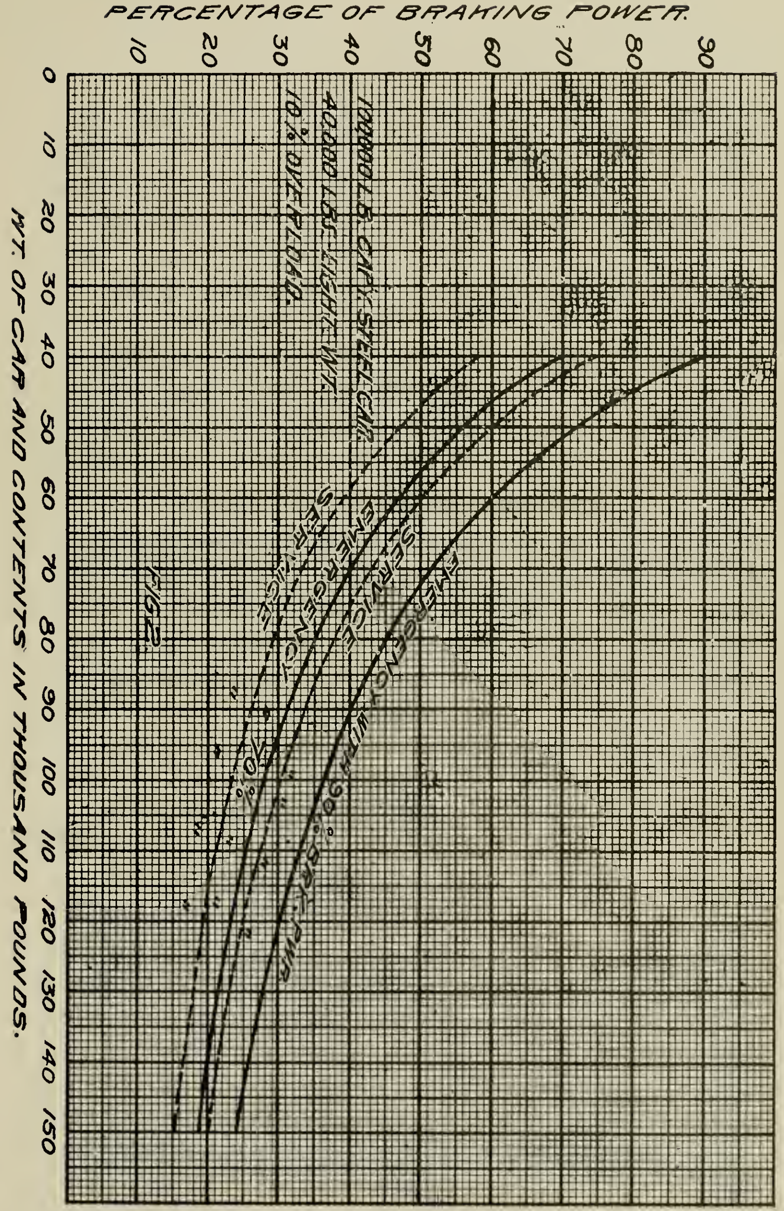
PERCENTAGE OF BRAKING POWER.
10
20
30
40
50
60
70
80
90
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
WT. OF CAR AND CONTENTS IN THOUSAND POUNDS.
100,000 LB. CAP'Y STEEL CAR.
40,000 LBS. LIGHT WT.
10% OVERLOAD.
SERVICE
70%
EMERGENCY
SERVICE
EMERGENCY
SERVICE
EMERGENCY WITH 90% BRK. PWR.

FIG. 2.

A comparative study of the curves, reveals the following:

EMPLOYING 70% BRAKING POWER.

Max. Br. Pr. 50,000 cap. car, light, in emergency	70 %
Max. Br. Pr. 100,000 cap. car, light, in emergency	70 %
Max. Br. Pr. 50,000 cap. car, light, in service	58 1-3%
Max. Br. Pr. 100,000 cap. car, light, in service	58 1-3%
Max. Br. Pr. 50,000 cap. car, loaded to full capacity plus 10% in emergency	21¼ %
Max. Br. Pr. 100,000 cap. car, loaded to full capacity plus 10% in emergency	18¾ %
Max. Br. Pr. 50,000 cap. car, loaded to full capacity plus 10% in service	17¼ %
Max. Br. Pr. 100,000 cap. car, loaded to full capacity plus 10% in service	15½ %

EMPLOYING 90% BRAKING POWER.

Max. Br. Pr. 50,000 cap. car, light, in emergency	90 %
Max. Br. Pr. 100,000 cap. car, light, in emergency	90 %
Max. Br. Pr. 50,000 cap. car, light, in service	75 %
Max. Br. Pr. 100,000 cap. car, light, in service	75 %
Max. Br. Pr. 50,000 cap. car, full capacity plus 10% in emergency	27 %
Max. Br. Pr. 100,000 cap. car, full capacity plus 10% in emergency	24 %
Max. Br. Pr. 50,000 cap. car, full capacity plus 10% in service	22½ %
Max. Br. Pr. 100,000 cap. car, full capacity plus 10% in service	20 %

It will thus be seen that when either class of car is light, the comparative percentages of braking power to the light weights are the same, with either an emergency, or service application of the brake, but that the percentage of braking power, is greater on the lighter capacity wooden car when they are both loaded to ten per cent. beyond their carrying capacities. The difference at first glance appears small, being but 2½ per cent. in an emergency application when employing 70 per cent. braking power, and 1¾ per cent. in a service application, but this amount is very important if we consider that when a car is loaded to 10 per cent. beyond its capacity, the braking power approximates but 20% of the total weight of car and contents. At best the percentage of retarding power is very low, compared with the retarding power afforded in passenger service. A practical demonstration of this, is found in heavy grade work, where the number of 100,000-pound capacity cars in a train, is usually limited to a certain number, owing to the reduction in the average percentage of braking power which is reduced as each heavy capacity car is added.

When employing a braking power of 90 per cent., and with both cars loaded to 10 per cent. beyond their capacities, the 50,000-pound capacity car, as compared with a 100,000-pound car, has 3 per cent. more braking power in an emergency application, and 2½ per cent. in a service application. The service application exceeds by, but 1¼ per cent, the braking power obtained on a 50,000 or 100,00-pound capacity car in an emergency application when employing 70% braking power.

With light cars, 20 per cent. is gained in an emergency application, when employing a braking power of 90 per cent.; in a service application 16 2-3 per cent. is gained.

With 50,000 and 100,000-pound capacity cars loaded to 10% beyond their capacities, the gain in percentage of braking power, with an emergency application, when employing a 90 per cent., instead of 70 per cent. braking power, is 5¾ per cent. with the 50,000 and 5¼ per cent. with the 100,000-pound capacity car. The corresponding gains with a service application are 5¼ and 4½ per cent.

The curves point out an especially interesting point, in connection with the use of a braking power of 90 per cent. The braking power is figured with a cylinder pressure of 60 pounds obtained in an emergency application; in a service application, but 50 pounds is obtained in the cylinder, thus reducing the braking power from 90 to 75 per cent. for ordinary service use. This being the case we have, in service applications, a margin of 15 per cent. plus the 10 per cent. unbraked weight on the wheels, to protect them from sliding.

It is somewhat surprising to see the immense amount of protection afforded by a very light load in a car. Referring to Figs. 1 and 2, it will be seen that, when using a braking power of 90%, a load of but 10,000 pounds reduces the maximum braking power available to 63½% with a 50,000-pound capacity wooden car, and to 72% on a 100,000-pound capacity steel car. It is thus evident that a very light load in a car affords ample protection against wheel sliding.

INSIDE HUNG BRAKES.

With inside hung brakes it is much easier to remove the wheels as it is not necessary to remove the brake beams. Brakes can be hung from the sand plank, thus getting rid of the variation in piston travel due to the raising or lowering of a car when emptied or loaded. So hung, the brake shoes will gravitate away from the wheels better without the need of release springs. When the brakes are suspended from the truck frame, the strain on the truck with inside hung brakes, is much less, owing to the brake shoes being so much nearer the truck center; the lever arm on which the friction of the brake shoes act to distort the truck is thus very materially reduced. This is especially true on four-wheel passenger trucks, as can readily be seen by observing them just before a train comes to rest. With inside hung brakes the lead shoe tends to tilt the truck up, while the trail shoe tends to pull the back end of the truck down, thus giving a backward instead of a forward tilt to the truck. The force of a car body acting through the king bolt, when a car is stopping, to tilt the truck and shift the weight to the lead pair of wheels is thus partially neutralized. The resultant severe jerk which accompanies a release of the brake just as a train comes to a rest, when using outside hung brakes, is reduced to a minimum by the use of brakes hung inside.

Much smoother stops can be made with inside hung brakes. With brake beams hung inside it is easier to so slant the hangers that the wedging action often found is practically eliminated, thus doing away with a factor which is responsible for many slid flat wheels. This is a much harder proposition to overcome when using outside hung brakes.

One of the arguments raised against the use of higher braking power on freight cars is that it is not practicable, owing to the shorter wheel base. This is, of course, a valid objection, but the figures submitted below show that as the carrying capacity of cars has increased there has also been an increase in the length of wheel base, and though this increase alone would not permit of an increase in braking power from 70 to 90%, it is one of the factors which aid in this direction.

The figures given were obtained from old M. C. B. reports, but they do not include exceptional conditions such as are presented in furniture, ore cars, etc.

Year	Ave. distance between truck centers in feet	Length of car outside of end sills	Centre of truck to outside edge of end sill
1888	18.75	. . .	. . .
1895	25·4	35·4	5·1
1903	26.5	36.8	5·3

10 INCH FREIGHT EQUIPMENT.

With the heavy capacity steel cars of to-day it is impractical, when using an 8-inch equipment, to employ a greater braking power than 70%. This is on account of the inadvisability of raising the total leverage above 9 to 1; with an 8-inch cylinder and 70% braking power on a car weighing 40,000 pounds the total leverage is 9 1-3 to 1. A 10-inch equipment should be used with cars the light weights of which exceed 40,000 pounds; changing at this point drops the total leverage from 9 1-3 to 1 down to about 6 to 1. This large equipment is a great aid in maintaining piston travel, since a small amount of shoe wear increases the piston travel much less than would be the case with the smaller equipment on the same car.

Employing the 10-inch equipment, 90% braking power may be used on cars the light weights of which reach 47,000 pounds, without exceeding a total leverage of 9 to 1.

While it cannot be said that the general practice of roads in the mountainous West is to use a braking power of 90%, 80% is very generally used, and some roads employ 90% with good results. There are special cases of ore roads, whose cars are not subject to interchange, which have for some time used as high as 120 and even 130% braking power. On these roads light cars are taken up the mountain and are brought down loaded with ore; this condition of light cars one way and loaded the other also permits of the use of the High Pressure Control Apparatus, with a variable train pipe pressure to suit the light and loaded trains. This is hardly a parallel case with the general conditions encountered, but the fact is included as having a general bearing on the subject under consideration.

Some roads are using the High Pressure Control device in lieu of a higher braking power. This device is very valuable in many ways, but cannot take the place of a higher braking power on heavy and long grades since, if the grade demanded sufficient reduction to obtain an equalization of reservoir and cylinder pressure when using a train pipe pressure of 90 pounds, we would be unable to accomplish a recharge between brake applications. The chief advantage afforded by this modification of the engine equipment in heavy grade work consists in the reserve power available in case the engineer desires to stop quickly. It also provides a leeway in case a grade is not so long but that a run can be made while losing a little train pipe and auxiliary reservoir pressure at each recharge. With 90% braking power this device would still be used to provide special advantages as at present.

Wheel sliding in the early days was undoubtedly due, to a large extent, to the fact that fewer air cars were coupled up with which to do the braking, and little attention was paid to maintenance; this made it necessary for the few cars coupled up, and the few of these cars that were operative, to do a much higher average amount of work than is required of the brakes at present. With the light car trains of to-day, with so many brakes coupled up, and better maintained, it is seldom necessary to make a full service application to bring a train to a stand-still on a level; formerly, where only a few brakes did the work, full braking power was used on each car, and the air brakes did a great deal of work that should have been done by the hand brakes. On account of having few brakes, they, of necessity, operated through a much longer period of time, thus greatly increasing the chance for wheel sliding at slow speed. With a high braking power, and possibly a little more wheel sliding with light cars, the stop would be made so quickly that the small amount of sliding would do practically no damage.

There is no doubt whatever but that a great amount of the wheel sliding done in the past, as well as in the present, can be charged up to hand brakes, stuck air brakes due to poor or en-

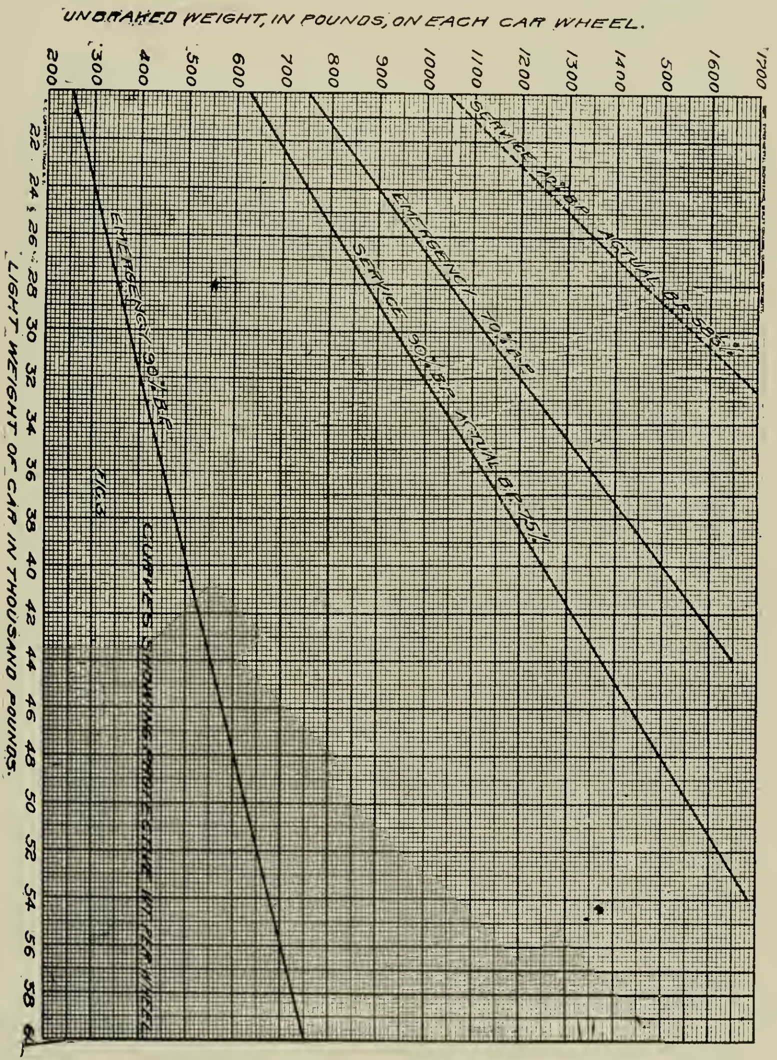
FIG. 3

tire lack of maintenance, and shoes frozen to wheels.

During the past two years considerable interest has been manifested as to the advisability of braking cars, not to a certain percentage of their light weight, but that each may have a certain protecting weight to guard it from wheel sliding, regardless of the amount of braking power. If, for instance, a certain class of car, which has experienced no flat wheels, when braked at 90%, has but 300 pounds of unbraked weight per wheel to protect them from sliding, it is argued that this is a sufficient protection for any wheel. If this course of reasoning holds good in practice there is no doubt but that the stopping power of the brakes can be increased and the length of stops reduced very materially. While there seems to be no doubt but what this theory may be safely carried out to a certain extent, the length to which we can go will be determined by some tests which are now in progress on one of the Eastern roads.

Fig. 3 contains curves from which can be read the protecting weight per wheel of different weights of cars, when employing the braking power as noted.

In the past it has not been uncommon to find cars as light as 45,000 pounds in weight braked to 90% of their light weight. The braking power would thus be 40,500 pounds, and the car would have a total protecting weight of 4,500 pounds, or 562 pounds per wheel. If 90% braking power were placed on cars with a light weight of 32,000 pounds as a minimum, the protecting weight per wheel in an emergency application of the brake would be 400 pounds, which is but 162 pounds less than that obtained with the case cited of a car weighing 45,000 pounds; the protecting weight in a full service application would be 995 pounds. It would seem that this difference of protective weight with this class of car, when using the emergency application of the brake, would be much more than offset by the many changes in conditions and equipment.

If the braking power on cars in general is not increased they will occasionally be placed in service on roads which employ a train pipe pressure of 90 pounds for grade work. In view of this fact it would seem advisable in figuring the strength of foundation gear for freight cars to look ahead to future requirements as well, and to design the equipment for operation in connection with a cylinder pressure of 80 instead of 60 pounds, as formerly.

This question was before the M. C. B. Association at their last meeting, and the committee was held over to report further at the 1904 Convention. A recommendation along this line will undoubtedly be made at their next meeting.

CONCLUSION.

In view of the increased number of air brake cars to do the work, the general use of inside hung brakes, increased distance between truck centers, change in brake shoes, the small percentage of braking power available on loaded cars, the additional safety provided, and the absolute necessity for more braking power to handle the heavy equipment on even 2% grades, it would seem advisable to increase the braking power on freight cars, which have the usual wheel base, whose weight exceeds 32,000 pounds, and especially on those cars having inside hung brakes.

President: Gentlemen, you have heard a splendid paper from a man who understands the subject thoroughly, and we should have a lively discussion. Mr. McConnell, will you kindly open it?

Mr. J. H. McConnell: Mr. Chairman, my first experience with air brakes dates back to 1869 or 1870. At the time the air brake was first intended to be put upon the market, it was looked upon by the railroads as an experiment. The Pennsylvania road, the Burlington and the Michigan Central purchased three equipments to experiment. The Union Pacific purchased a fourth, and at that time I was general foreman of the Union Pacific shops at Omaha. When the equipment came to Omaha, Mr. Westinghouse came with it to superintend its erection. And the pump we applied to Engine No. 73 was pump numbered 9, so you see that was quite early in the air brake history. Equipments came for three locomotives and a passenger train. We equipped the three locomotives and ran them out of Omaha with a passenger train.

A great deal of difficulty was experienced with the early brake on account of the brake sticking. It was quite a common experience then for a train in starting away from the station to have a brakeman get off and release the brake before the train could start. Then the pump gave a great deal of trouble. It would work awhile and then it would stop a part of the time. Improvements made in the pump soon remedied that difficulty. The first application was straight air. Afterwards that was changed to the automatic. After that came the quick action. With all those improvements, air brake service on passenger trains improved.

While it is true that in the early history of the air brake there were a great many slid flat wheels, with the better appliances and improvements made by the Westinghouse Company that difficulty was in a large measure overcome.

When the Denver and Rio Grande Railroad was first built, it was a narrow gauge line. They applied air to all of their freight equipment, and it is my recollection that that is the first railroad in the country that had their freight equipment entirely equipped with air brakes. The Central Pacific and the Southern Pacific and the Union Pacific afterwards followed and commenced equipping their cars with air. It was quite a common occurrence then to have slid flat wheels, from the fact of so few cars being equipped with air at that time. As the roads increased their air equipment, these difficulties began to decrease. Another thing, equipment was not taken care of at that time the way it is at the present time. On one of the western roads they handled the freight trains with air as successfully as they do the passenger trains. A great many of the Western roads, to my knowledge, at this time use 85% of the light weight of the car as their braking power. And the roads with heavy grades use higher power and are more successful in the handling of the equipment. I think, as a rule with the Western roads, they handle their freight trains a great deal better than the Eastern roads. I think the point Mr. Blackall makes is entirely correct, and there is not any doubt in my mind that it will add to the efficiency of the brake to increase the braking power to at least 85%.

And I do not believe that the Eastern roads take the same care of their freight equipment that they do out West. It may be on account of so many more level roads. But in roads in the Western country, where they have a 4% grade, they handle their equipment entirely by air, and it is absolutely necessary that the brake should be in the highest state of perfection. Now, some of the roads in the West, one road in particular where they have a grade of 82 feet to the mile for 32 miles, and another place they have 90 feet to the mile for 5 miles, they let their freight trains down as nicely as they do their passenger trains. I have read of freight trains on Western roads where they handle 40 cars, go over the road without a jar, the same as they do with their passenger trains.

President: Mr. Bellows, can you say something on this subject?

Mr. A. B. Bellows: I do not pose as an air brake expert. I would rather the other gentlemen would say something first.

President: Mr. Yohe, we would like to hear from you how far we can apply the ten inch cylinders, with our present system of brake levers and connections, on freight cars.

Mr. J. K. Yohe: Mr. President and gentlemen, conditions are varied on our road. We have practically a level road where we operate, and we have never had any trouble with the present braking power. Formerly we used only ten cars of air on a train. Then we increased it to fifteen, and finally to twenty-five, and now I believe about half of the cars in a train is what we are using. We have never had any trouble with stopping trains with the present pressure on our road. I cannot tell you anything about other roads where they have grades to contend with, because we have nothing of that kind on our roads at all. I wish to say that nine-tenths of our broken cars in transit are caused by broken trains, caused by the severe application of the brakes on account of not using all the air brake cars in the train. If the time comes when we can use all the air brake cars in the train, I would think we could increase our pressure; I do not think, though, that we could increase our pressure on new equipment of cars, that is, ten-inch equipment, and use them along with eight-inch equipment successfully in same train.

Of course there are a great many other things in favor of an increased pressure on heavy grades. As the gentleman says, the Western roads do keep up their equipment better than they do on the Eastern roads. I have not studied this question particularly, but I am not in favor on our road of having increased pressure or braking power. We have a great many slid driving wheels now, at the pressure we are carrying. It seems to me that if we increase our braking power on our cars, we will have to decrease it on our driving brakes, in order to keep from sliding our driving wheels. Where you have the inside connected brake on freight trains, you can take the wheels out very easily; but it is not so easy to take driving wheels out. The friction that the shoe has upon the wheel cause the retarding motion, and the pressure without this friction would be useless. The new ten-inch equipment would be very costly to railroads, and would take years to make the change, and as I said before, I don't believe a ten-inch and an eight-inch equipment could be operated successfully in same train.

Mr. McConnell. I would like to say something in regard to slid flat driving wheels. My experience in that direction has been that it is not from the application of the brake, but it is because the engineer pulls his engine over to assist in making the stop. I think that in most of the cases, if you will investigate, it will be found that the engineer has pulled over at the same time the brake was applied. In nearly every case it will slide the driving wheels.

President: There are quite a number of gentlemen here engaged in repairing locomotives and cars. Mr. Blackall will be glad to give you any information on the subject. Mr. Wright, what can you say on the subject?

Mr. R. V. Wright: In order to increase the braking power to 90% of the light weight of the car, can we not increase the leverage rather than increase the size of the cylinder? If this cannot be done, can we not increase the train line pressure so that the eight-inch cylinder with the increased pressure will be equal to a ten-inch cylinder with the present pressure?

Mr. Robert H. Blackall: In regard to that, I would say that with an eight-inch cylinder you could certainly use a higher train pipe pressure, and it would help you to stop very much quicker. What we want to get at is the conditions that will produce the best results, not on a local road, but in the country in general. We have gone on and developed the brake for passenger service so that with high speed service we get from 130% to 135% braking power. Of course with the old braking power that we had developed with a 70-pound train pipe pressure, and without the high-speed reducing valve, we could stop, as far as that is concerned; but with the improved apparatus we gain about 30% in stopping by using the high pressure, which results in a high braking power at high speed, and this power is gradually and automatically reduced to correspond with the speed of the train.

You say you do not have any trouble in stopping with 70% braking power. That is true, under certain conditions; but if you had to stop 100 feet sooner to save a wreck, that 90% braking power would help you out. You would still have the chance to use your higher train pipe pressure even if you increase your braking power. What we are after is to get a brake that will give us more power in heavy grade braking, and that will permit of a quicker stop on either a grade or on a level.

President: What percentage of the freight car equipment of this country is equipped with eight-inch cylinders?

Mr. Robert H. Blackall: You can practically say 99%, though during the last year and a half the ten-inch equipment is being put on quite a number of cars, and should be used on all cars that weigh 40,000 pounds or over when using 70% braking power. If you use 70% braking power and the light weight of your car is 40,000 pounds, you have a total leverage, that is you multiply the power of the brake cylinder 9 1-3 times. Of course if you increase your power you reduce your shoe movement per inch of piston travel, with the result that you do not get enough shoe clearance with standard piston travel. With a small amount of wear on the brake shoe the piston movement increases very fast, and the inspector has to get under the car to adjust the shoes correspondingly often. There is very much less work to maintain your piston travel with the lower leverage. You would have a little greater initial cost with the ten-inch equipment, but you would save it in inspectors' wages. If you get more than a nine to one leverage, you will find that you are using too much coal to pull your cars, because the small shoe clearance will cause the shoes to drag, thus making a hard-pulling train.

Mr. A. B. Bellows: I would like to inquire of Mr. Blackall whether anything has been done in the way of changing the leverage, so that when the car is loaded you get 90% and with a light car you get 70%? The D., L. & W. had some cars built at the Pressed Steel Car Co. with an eccentric. When the car was loaded there was supposed to be an eccentric movemen that changed the leverage, so that the braking power of that car would be 90%, while with the car unloaded it would be changed to 70%.

Mr. Robert H. Blackall: I know there have been some patents taken out covering methods of this sort, where one end of a lever is attached to the car body; when the car is loaded the deflection automatically changes the leverage and increases the braking power. One of the main objections to this is that the springs eventually take a set, and the high braking power is obtained when not desired.. I do not know what has been the outcome of those particular cars built for the D., L. & W. I see Mr. Stucki here. He might tell us. He was with the Pressed Steel Car Co. at that time.

Mr. A. Stucki: In regard to those brakes, I may say that we equipped 50 cars while I was with the Pressed Steel Car Company. The idea was to have a braking power equal to 70% of the light weight of the car in one case and about twice as much in another case. This was accomplished by simply having an eccentric inserted into the cylinder lever, which was turned into one position or the other by a small handle. This shifted the fulcrum of the lever, so as to bring about the results above mentioned. It was the intention to turn the handle into "light" position as soon as the car was unloaded, and into a "loaded" position as soon as loaded. I think Mr. Canfield stated that this increased the braking force of the loaded cars from 17% to 34%, and that the results obtained were good indeed.

But in doing this, or by increasing the braking force in any other way, we must be careful so as not to "rob Peter to pay Paul." By increasing the braking power from 70% to 90% we may improve the brake system, but it will be that much harder on the wheels, and all gentlemen present will agree with me that on a 50-ton car a cast iron wheel is pretty highly taxed now. Therefore, before we increase the maximum pressure on the wheels we should consider the step very carefully.

When I was connected with one of our neighboring roads a great deal of trouble was experienced with the passenger equipment on account of heated and slid wheels, and finally the trouble was completely overcome by reducing the braking power. To what extent, I do not remember any more. This was before the high speed brake was adopted.

Using Mr. Blackall's own words, the conditions when we first started out with air brakes were not nearly as favorable as they now are. We had then a comparatively small number of air cars in a train, just the reverse from the present conditions, and the air brake system in itself was certainly greatly improved since those days; therefore, I do not see why we should at once increase the maximum braking force from 70% to 90%, as I judge from the tone of the paper it is the intention to do.

There may be other means of accomplishing the same result without increasing the liability of trouble with the wheels. Besides, the arrangement of a shifting fulcrum just mentioned by Mr. Bellows, there was a triple valve tried out West which is reported as having given good satisfaction. It provides for one braking power for light cars and another for partially or fully loaded cars. I have reference to the Hibbard triple valve.

Another scheme with the same point in view was tried and favorably reported on. It consisted of two sets of cylinders of different size—the small one being used for empty cars only, while the larger one is thrown into action on loaded ones. Of course we all admit this is somewhat expensive. The ideal system, of course, would be the one where the braking power is made directly proportional to the load, no matter what it may be, as mentioned by Mr. Bellows. This would mean a spring actuated arrangement. Some such arrangement, I think, is being used in Europe, but I do not know of any being used in this country under heavy cars, and there is still some hope left that something of this kind may yet be successfully worked out.

Another possible way would be by changing the composition of the brake shoes. By jumping from 70% to 90% of maximum braking power, we increase the power on the loaded 50-ton cars in service application only by about 4½%. We all know that we do not want braking power, but stopping power. Now I remember that the brake shoe tests made by the M. C. B. Association disclosed a co-efficient of friction as ranging from 16½% to 39%, and I therefore think that a slight change in the composition of the brake shoes would bring about the same results without making it necessary to increase the pressure on the wheels.

I understand that one of the Eastern roads is now making experiments in order to find out whether 80% of braking power, such as used by most of the Western roads, is successful on their roads and under their conditions, and I therefore would suggest to go slow in the matter, and under no consideration make too great a jump.

Mr. Robert H. Blackall: In regard to the 90% braking power, I think if you read the conclusion you will see that there is no per cent. mentioned. I simply took 90% to make a comparison. I am of the opinion, however, that it will probably be 85% or 90%. One reason this paper was brought up was to get the ideas of the mechanical men who are here and who have had practical experience in these matters.

Mr. Stucki asks, if reducing the braking power will get rid of hot wheels. If you are going to make a stop or are coming down a grade, it does not make any difference whether you reduce your braking power or not, you have so much work to do. If you reduce your braking power your cylinder pressure must be correspondingly higher. Your brake shoes must do a certain amount of work, the same in either case, and I do not see how it would help your wheels to reduce your braking power; reducing the braking power might help you out on flat wheels. Some people have raised their braking power to get rid of flat wheels. The Nashville, Chattanooga and St. Louis road put up their braking power to accomplish this result. Some of their new cars had 90% and some of their old ones had 60%, so that their new cars were doing more than their share of the work. They simply raised their braking power up to 90 and thus making each car do the same percentage of work, and got rid of flat wheels altogether. Mr. Stucki speaks of robbing Peter to pay Paul. I suppose by that he means using more air?

Mr. Stucki: No, I mean improving the braking system to make better conditions for the wheels first.

Mr. Robert H. Blackall: We have this condition, solid trains of heavy capacity steel cars, and if you get a certain grade you have to do a certain amount of work to get them down. What is the difference whether we brake at 70% and use 50 pounds cylinder pressure, or 90% with 35 pounds cylinder pressure to do the work? You are not doing any more work to let your train down, but you have the extra power available if you need it. You can brake a train of 100,000 pounds capacity steel cars at 70% and let them down without any trouble if everything is in good condition, but if you strike a short flag you cannot stop quickly on a 2% grade if you are not fully recharged. In regard to what you say about the brake shoes, I can agree with you partly, but the subject of brake shoes is something that there is less known about than anything I know of in railroading. A soft brake shoe sounds nice, but railroads won't buy them because they have to change the shoes so often, and if all roads do not use them, those that do furnish more than their share of shoes and expense.

Another thing; a soft brake shoe is a good thing as long as you don't make it do too much work. If it is overworked the metal gets hot, the tendency to flow has the effect of a lubricant, and you reduce the co-efficient of friction. Take a soft shoe, put it on a slow running train and it is all right, but put it on a high speed train and it gets hot and you have not your average co-efficient that you have if you use a harder shoe. Brake shoes are a subject for a paper in themselves, but I am glad to have the point brought up, for it is a very important one.

Mr. Stucki misunderstood me as stating that they are making tests in the East with 80% braking power on freight cars.

Mr. Stucki: I had the information from another gentleman.

Mr. Blackall: They are going to make some, but they have not started yet. They are making experiments now to find just what weight on a wheel is necessary to keep it from sliding. Supposing 500 pounds will protect it. If we get a big Pullman car weighing 130,000 pounds we can get a braking power of about 98%, and yet have enough protection to keep the wheels from sliding.

Mr. R. V. Wright: Suppose a road with 15,000 cars buys 1,000 new ones and brakes them up to 90% of their light weight. Judging from Mr. Blackall's remarks concerning the Nashville, Chattanooga and St. Louis it will be necessary to increase the braking power of the 15,000 old cars to 90% of their light weight in order to run the new ones successfully. If this is not done, the new cars will have to do more than their share of the braking, and will have slid flat wheels. To make this change it will apparently be necessary to change the eight inch cylinders now under the old cars to a ten inch. The statement has been made that 99% of the freight cars in this country are equipped with 8 inch cylinders. Will it pay to go to the expense of changing these? Why can't we simply increase our train line pressure and keep the 8 inch cylinders rather than increase the size of cylinders? Will it be possible for the brake rigging now under the old cars to stand the additional load which will come upon it? We know that in changing the brakes under our passenger equipment from quick action to high speed, it was necessary to increase the size of the rods, levers, pins, etc.

Mr. Blackall: In answer to Mr. Wright's question in regard to the advisability of changing from 8 inch to 10 inch on all cars, I would consider it decidedly impracticable to do anything like that. I think you are looking at it from the wrong standpoint. For instance, we have a lot of cars braked at 70%. We load these cars and reduce it to 20, and have a variation of 50% braking power between the light and loaded cars. If we should raise the braking power to 90% we would have a variation of 70% between the light and loaded cars in a train. Owing to this variation in braking power, we have found that it does not do to put many light cars at the end of a long train. This simply means that we will have to switch the light cars up ahead, and this practice is common on some roads if there are many empty cars at the rear.

With only 10,000 pounds in one of those cars braked at 90%, the braking power drops down to 72% with a 100,000 pound capacity car, and to about 68 with a 50,000. It will thus be seen that a very light load in car gives ample protection against wheel sliding. It would be very impracticable to change brake cylinders and use larger ones with the smaller levers on the old cars, on account of the excessive fibre strain. Let the equipment with 70% go as it is, but with new equipment design the foundation gear for a higher braking power, and a cylinder pressure of 78 pounds, obtained by using a train pipe pressure of 90 pounds.

I would very much like an expression of opinion from some practical men who have seen wheels sliding and know just what is causing the sliding.

Mr. Wright: As we have a large number of 100,000 pound cars that are braking 70%, suppose we make up a train of 100,000 pound capacity cars, half braked at 70% and half at 90%, will that work well? Wouldn't those braked at 90% have more slid wheels?

Mr. Robert H. Blackall: There is no doubt but that the tendency would be in this direction, but a little wheel sliding, with an empty car, does no damage, and with a very light load the braking power, as already pointed out, is reduced rapidly. Is there anyone present who can give any information as to how far the wheels on an empty car can be slid without producing flat spots?

Secretary Conway: Mr. Dyer can, perhaps, answer that.

Mr. Joseph Dyer: I do not know that we come across a flat wheel on empty cars once in three months. It is very rare that we have a flat wheel from sliding an empty car.

Mr. Stucki: There is only one point Mr. Blackall has mentioned that I question. He says that although 90% of braking power is provided for, nobody is going to use it unless they need it. I would be glad if that statement would hold good, but I am inclined to think different.

A great deal is said about the difference of braking power between the service and emergency application. Now the main aim of an emergency stop is not to go beyond the maximum allowable braking power, else the wheels would slip and reduce the stopping power, but it is the aim to reach the last car in the shortest possible time, and if it were possible we should use this same maximum braking power in the service application. Of course this is impossible, but the larger we make the reservoir (leaving the train pipe the same), the smaller the difference between the two modes of application will be.

Mr. Robert H. Blackall: The trouble is, if you did this you would get more in the service, and in the emergency application also.

The beauty of the brake is, that if you use a braking power of 90% in emergency, a braking power of but 75% is obtained with a full service application; it will thus be seen that there is 25% of the weight of a light car to protect the wheels in a service application. If an emergency application is used and the wheels on an empty car are slid, the stop will be made too quickly to flatten wheels.

I dare not tell you how far a wheel will slide, when the car is light, without doing it any harm. I would rather have a car man tell you. The conditions are not the same as on a passenger car, which weighs 70,000 pounds, in which case each wheel carries a weight of 8,750 pounds. Few freight cars weigh over 40,000 pounds, in which case the weight on each wheel is but 5,000 pounds, heaviest we have excepting a few coke cars.

Mr. A. Stucki: My question was not exactly understood. What I meant to say was this: A larger reservoir would increase the air pressure for a given piston travel in the service application a good deal, but not as much in the emergency application, and this would be just what we want, since after a series of successive service applications and releases we may at once need all the power we have left to prevent an accident.

Mr. Blackall: You cannot raise one without raising the other.

Mr. J. D. McIlwain: We have heard this very interesting paper and discussion, and I think all of us are, or have been, interested in the subject of air brakes, and as Mr. Blackall has to leave to catch a train, I wish to move a vote of thanks to Mr. Blackall and those who have assisted him in the discussion.

The motion was carried.

Mr. Joseph Dyer: Before we close the discussion of this question I want to say that I have on occasions assisted at the inspection of air brake equipment of cars of three trains that have run away down grade to ascertain the cause, and it was found in each case that the cause was entirely due to non-maintenance and improper adjustment. On a large percentage of cars the brakes would apply only upon emergency application. Other brakes would not answer to the emergency application. Other cars had a piston travel of over 10½ inches, and other cars in the trains had the air cut out in consequence of the foundation brakes being out of order.

The experience impressed me with a belief that, kept in good repair and properly cleaned and oiled in accordance with the rules of the M. C. B. Association, the present equipment will meet the requirements of the present day. If such a condition is to be considered as ideal and seldom obtained it is probably necessary to change the equipment.

Mr. McIlwain: There is one question that bothered me considerable in my railroad experience, and that is this. We have had reports from train men, conductors, engineers, etc., that when they have had an accident the brakes failed to act. Now is there a railroad man in the room with experience in air brakes who ever knew of an accident caused by the brakes failing to work if they were in good order and properly operated?

Mr. Walter V. Turner, of the Westinghouse Company: I would like to say, in answer to the gentleman who just spoke, that for the air brakes to fail to work if they are in proper order and taken care of is absolutely impossible. There are 50 brakes on a 50-car train, and for those brakes to fail to apply in the emergency application, there must be three or four that are either cut out or out of order. If they are out of order then the gentleman is answered. If they are cut in they will certainly work in the emergency, and I may say also that if they are in order they will work in the service application. You might have an exception to that, but I will undertake to take any 50 old triples you will find on any railroad here and put them in proper condition, and I will guarantee that every one of them will work. A failure with things in proper condition is an absolute impossibility.

Mr. J. C. Hermann: The point is raised by a gentleman here whether it would not be more economical to readjust the brake power by raising the pressure. The objection Mr. Blackall had to that was that it would require more frequent adjustment of the brakes on account of the wear of the brake shoes. That would be necessitated, as I understand it, by the longer leverage, that is if you have 4 to 1 or 5 to 1 the quicker movement would necessitate greater travel of the brake shoe. I think greater leverage might be obtained by lengthening the levers, with less cost than putting in new cylinders, and that would answer the same purpose and make the travel of the brake shoe just as small as it was before.

Mr. W. V. Turner: I would like to say that the small cylinder has been worked to the limit. 100,000 pound capacity cars are now braked at about 9½ to 1, which gives so small an amount of shoe clearance that it is exceedingly hard work for an engine now to pull a train if the piston travel is adjusted to where it ought to be, that is, 5 inches standing travel, which will give you from 6 to 8 inches running travel. Therefore, any such schemes as will change the levers by an eccentric is a step in the wrong direction, because that simply will change it from 9½ to 1 perhaps to 12 to 1 or 14 to 1, and in consequence you will have so contracted your shoe clearance proportionately, and you will obtain a high braking power which will retard you, not only going down hill, but also going up, or on the level, and if you carry that to the extreme it will be impossible to move the train. So that the eccentric and the small cylinder are an impossibility as a means of obtaining a higher braking power or a greater efficiency of the brake.

Chair: If there are no further remarks we will declare this meeting adjourned.

On motion, adjourned.

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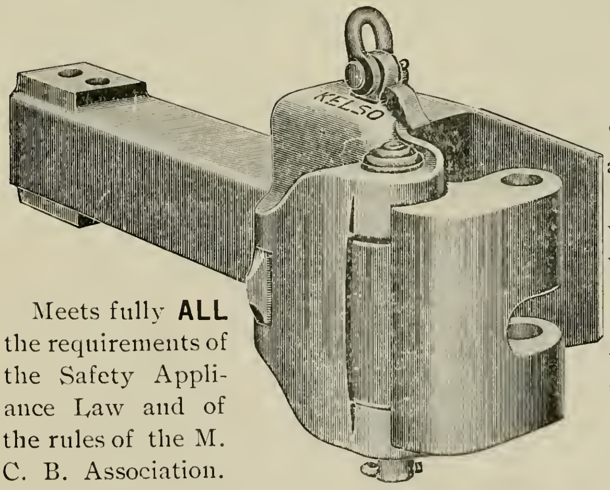

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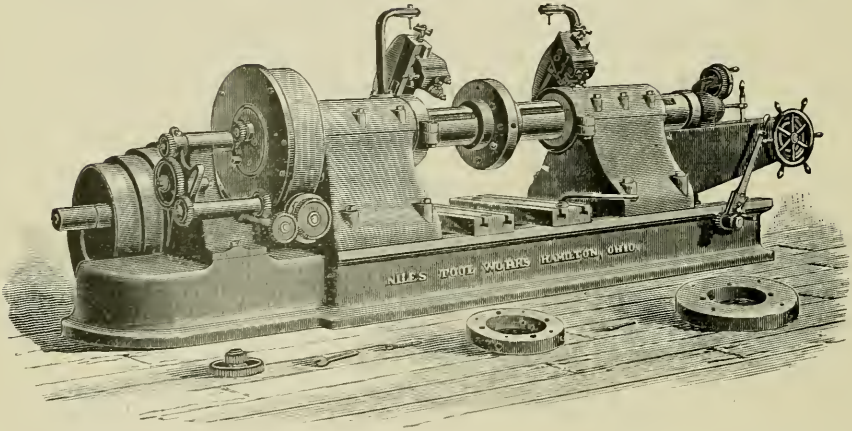
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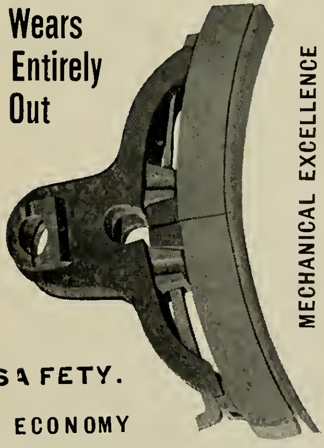

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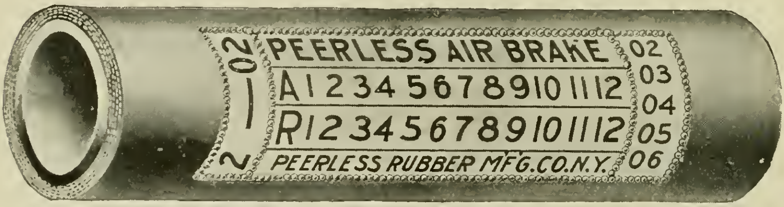
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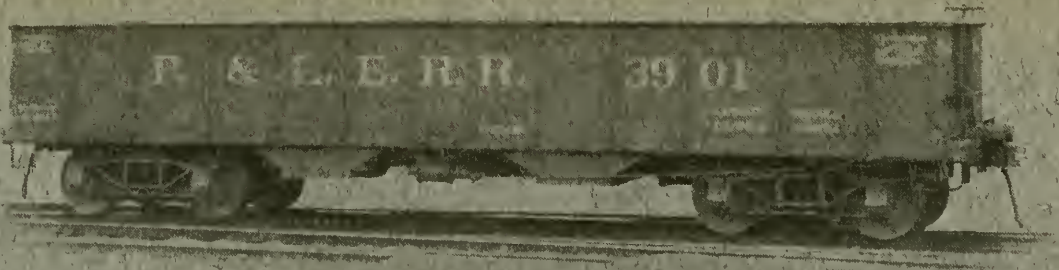

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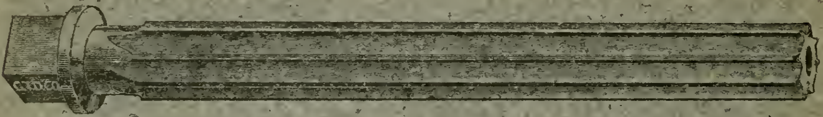

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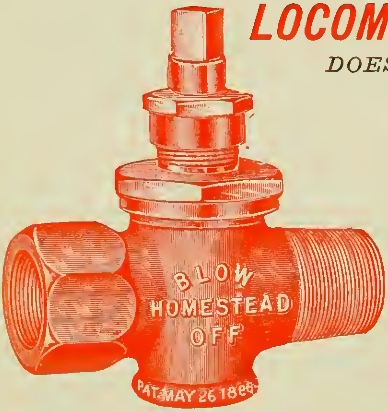

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Classified Index of Advertisements

Air Brakes—
Westinghouse Air Brake Co............. ix

Air Compressors—
Chicago Pneumatic Tool Co.......... xiii
Manning, Maxwell & Moore............ xv

Babbit Metal—
Damascus Bronze Co., Inside front cover
Lawrenceville Bronze Co.,.............. xi
Magnus Metal Co.,.................... vi

Belting—
J. D. McIlwain & Co.,....................... x
Hukill-Hunter Co.,.......................... xvi

Boiler Washers and Testers—
Nathan Manufacturing Co.,............ iv

Boiler Lagging—
Franklin Manufacturing Co............ xv

Boiler Tubes—
National Tube Co.,..................... v

Bolsters—
Pressed Steel Car Co.,......................
Outside back cover

Brass and Bronze Castings—
Damascus Bronze Co.,.....................
Inside front cover
Lawrenceville Bronze Co.,............... xi
Magnus Metal Co.,............................ vi

Brake Shoes—
American Brake Shoe & Foundry Co. ii
Hukill-Hunter Co.,..... xvi

Car Couplers—
Gould Coupler Co.,............................ ii
McConway & Torley Co.................... xi
National Malleable Castings Co.,...... vi

Car Heating and Lighting—
Gold Car Heating Co......................... vi
Safety Car Heating and Lighting Co. xiii

Castings—Malleable Iron—
National Malleable Castings Co.,...... vi

Coal and Coke—
Washington Coal and Coke Co.,....... xii

Conveying Machinery—
J. D. McIlwain & Co.,...................... x
Manning, Maxwell & Moore............ xv

Corner Bands—
Pressed Steel Car Co.,.......................
Outside back cover

Drills—Twist—
Cleveland Twist Drill Co.................
Inside front cover

Friction Draft Gear—
Westinghouse Air Brake Co.,............ ix

Graphite—
Jos. Dixon Crucible Co...................... vi

Hoisting Engines—
J. D. McIlwain & Co.,....................... x

Hose Clamps—
J. D. McIlwain & Co.,....................... x

Injectors—
Nathan Manufacturing Co.,............ iv

Jacks—
J. D. McIlwain & Co.,....................... x
Hukill-Hunter Co............................. xvi

Journal Bearings—
Damascus Bronze Co.,.....................
Inside front cover
Lawrenceville Bronze Co.,...... xi
Magnus Metal Co.,............................ vi

Locomotives—
American Locomotive Co.............. xiv

Lubricators—
J. D. McIlwain & Co.,......... x
Nathan Manufacturing Co.,............ iv

Machine Tools—
Niles Tool Works,............................ xii
Manning, Maxwell & Moore............ xv

Magazines—
Railway Age..................................... iii

Malleable Iron—
Fort Pitt Malleable and Grey Iron Co.......................................xvii

Oils—
Galena Signal Oil Co......... xvii

Oil Cups—
Nathan Manufacturing Co.,............ iv

Packing—
J. D. McIlwain & Co.,....................... x
Franklin Manufacturing Co.,.......... xv

Paints—
Sherwin—Williams Co.,.................... ii
The Lowe Brothers Co.,.................... xvi
M. B. Suydam Co. i
Chas. R. Long, Jr........... iii

Paint Machines—
J. D. McIlwain & Co.,....................... x

Pipe and Pipe Fittings—
National Tube Co.,........................... v

Pipe Joint Paste and Compound—
Jos. Dixon Crucible Co..................... vi

Pneumatic Tools—
Chicago Pneumatic Tool Co,.......... xiii
Manning, Maxwell & Moore............ xv

Pulleys—
J. D. McIlwain & Co.,....................... x
Hukill-Hunter Co.,.......... xvi

Reamers—
Cleveland Twist Drill Co.,................
Inside front cover

Rubber Goods—
Peerless Rubber Mfg. Co.,................ xvi
Hukill Hunter Co.,................. xvi

Safe Ends for Boiler Tubes—
National Tube Co.,........................... v

Index—Continued.

Side Stakes—
Pressed Steel Car Co.,..... .... Outside back cover

Spring Buffer Blocks—
Gould Coupler Co.... ii

Stay Bolt Iron—
B. M. Jones & Co........................... xiv
Sligo Iron & Steel Co.................. xviii

Stake Pockets—
Pressed Steel Car Co.,..................... Outside back cover

Stay-Bolt Taps—
Cleveland Twist Drill Co.,............... Inside front cover

Steam Fire Extinguishers for Locomotives—
Nathan Manufacturing Co.,............ iv

Steel Tires—
Latrobe Steel Co.,............. iv

Steel Tired Wheels—
Railway Steel Spring Co... xiii

Springs—
Railway Steel Spring Co......... xiii

Steel Cars—
Pressed Steel Car Co.,...................... Outside back cover

Steel—Mushet's—
B. M. Jones & Co........................... xiv

Tools—
Cleveland Twist Drill Co.,............... Inside front cover

Trucks and Truck Frames—
Pressed Steel Car Co.......... .... Outside back cover

Valves—
Homestead Valve Mfg. Co..... iv

Varnishes—
Sherwin-Williams Co., ... ii

Weldless Steel Flanges—
Latrobe Steel Co.,............................ iv

Wheels—
National Car Wheel Co.,................. Inside front cover

Wooden Cars—
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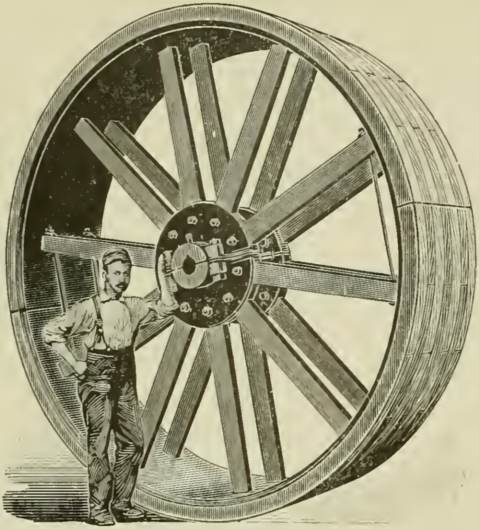

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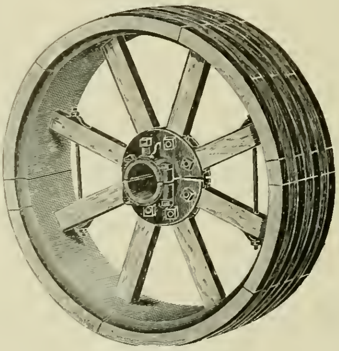

OFFICIAL PROCEEDINGS
of the
Railway Club *of* Pittsburgh.

ORGANIZED OCTOBER 18, 1901.

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Meetings held fourth Friday each month, except June, July and August.

PROCEEDINGS OF MEETING,
FEBRUARY 26th, 1904.

The meeting was called to order at 8 o'clock P. M. at the Hotel Henry, Pittsburgh, Pa., with President L. H. Turner in the chair.

The following gentlemen registered:

MEMBERS.

Anderson, H. T.
Bell, Walter K.
Blackall, Robert H.
Carpenter, Frank.
Carson, G. E.
Clarke, H. P.
Conway, J. D.
Courtney, D. C.
Currie, J. C.
Decker, O. S.
Ford, D. W.
Gies, George E.
Grieves, E. W.
Grove, E. M.
Hall, W. G.
Haring, Ellsworth.
Harris, J. D.
Hastings, C. L.
Herr, E. M.
Herrmann, J. C.
Hood, Charles.
Howe, D. M.
Hughes, John E.
Hunter, H. S.
Huyett, E. G.
Hyndman, F. T.
Jeny, Jacob.
Kearney, A.
Kessler, D. D.
Knight, E. A.
Lawson, Sherman S.
Lee, L. A.
Lindstrom, Charles A.
Lininger, Wm.
Lobez, P. L.
Long, Robert M.
Macoubray, R. J.
Madden, W. E.
Morris, W. B.
Moyer, F. H.
McIlwain, J. D.
McMullin, F. V.
McNulty, F.
Noble, D. C.
Obey, G. B.
Oates, George M.
Palmer, C. A.
Partington, James.
Proven, John.
Quest, W. O.
Redding, D. J.
Rhodes, G. P.
Richardson, W. P.
Safford, J. B.
Schauer, A. J.
Scheck, H. G.
Shaler, Fred J.
Shannon, Charles.
Smith, D. W.
Snyder, Antes.
Stark, F. H.
Sweeley, G. P.
Tracy, M. S.
Tucker, John L.
Turner, L. H.
Warne, J. C.
Warnock, H. R.
Weisbrod, J. F.
Whitney, Louis B.
Wynn, B. F.
Yohe, J. B.

VISITORS.

Alleman, C. W.
Anderson, A. E.
Barnsley, George T.
Bearinger, John.
Conner, Charles.
Delaplane, J. L.
Dittman, Vance R.
Haynes, J. E.
Herman, R.
Hindman, S. M.
Hindman, J. E.
Hobson, J. S.
Holme, J. S.
Jackson, Charles A.
Jacob, W. W.
Johnson, Sidney.
Killinger, D. R.
Linehan, J. C.
Little, D. B.
Mensch, E. M.
McConnell, C. H.
Nickel, J. K.
Polk, W. A.
Relde, H. C.
Scheck, H. A.
Schoyer, A. M.
Schmidt, Walter.
Scovell, W. N.
Smith, Sion B.
Williams, D. F.

President: The minutes of the last meeting are in the hands of the printer, and will be distributed without being read to-night.

The following proposals for membership were read by the Secretary:

D. McNamara, Mechanical Expert, Galena Signal Oil Co., Meadville, Pa.

G. C. Isbester, Rep. Railway Appliances Co., Old Colony Building, Chicago, Ill.

F. R. Jennings, Engineering Department, Pressed Steel Car Co., McKees Rocks, Pa.

C. H. McConnell, Electrician, P. & L. E. R. R. Co., Beaver, Pa.

C. O. Dambach, Chief Clerk to Superintendent West Side Belt Railway Co., 790 West Carson street, Pittsburgh, Pa.

A. D. Chittenden, Chief Clerk to General Manager B. & L. E. R. R., Carnegie building, Pittsburgh, Pa.

S. M. Hindman, General Inspector, P. R. R. Co., Pitcairn, Pa.

R. L. Kleine, General Car Inspector, P. R. R. Co., Altoona, Pa.

D. F. Williams, Chief Clerk to General Superintendent Pennsylvania Lines West of Pittsburgh, Union Station, Pittsburgh, Pa.

F. L. Dunn, Draftsman, Butler Construction Co., Brighton Road, Allegheny, Pa.

Barton Grubbs, Rep. American Nut and Bolt Fastener Co., 306 Frick building, Pittsburgh, Pa.

C. W. Shupe, Inspector, P. & L. E. R. R. Co., Jacobs Creek, Pa.

R. Herman, Manufacturer Auto. Railway Signals, Crafton, Pa.

H. J. Halleran, Order Department Standard Steel Car Co., Frick building, Pittsburgh, Pa.

A. M. Schoyer, General Superintendent Pennsylvania Lines West of Pittsburgh, Pittsburgh, Pa.

George T. Barnesley, Res. Engineer Wabash R. R. Co., Pittsburgh, Pa.

W. A. Polk, Rep. The Patterson-Sargent Co., 42 Hudson street, New York.

The following communications were read by the Secretary:

Chicago, February 25, 1904.

J. D. Conway, Esq., Secretary Pittsburgh Railway Club, Pittsburgh, Pa.

Dear Sir: I hope you can make it convenient to consider the rules of interchange at your April meeting, so that your suggestions may be in the hands of the Arbitration Committee at the earliest possible date thereafter. The Arbitration Committee will probably hold a meeting early in May to make up its report, and will be glad to receive any suggestions you may wish to make.

Yours truly,
JOS. W. TAYLOR,
Secretary Master Car Builders' Association.

President: If there are no objections, our Secretary will notify the Secretary of the Association that we have a standing committee who will make a report at the proper time.

President: Gentlemen, we are fortunate to-night in having a paper on one of the most interesting subjects and one of the most important branches of railroad work. And we are also particularly fortunate in having a gentleman to present it who is an acknowledged authority upon the subject. I take great pleasure in introducing to you Mr. A. M. Schoyer, General Superintendent of the Pennsylvania Lines West of Pittsburgh.

Mr. A. M. Schoyer: Mr. Chairman and Gentlemen—In reading this paper to-night I do not want it in any light to be considered as a paper written by a signal man or by an expert. But what I have tried to do is to bring forth two or three thoughts which I believe it would be well for all of us to consider, namely, the questions of color for night signals, the question of railways controlled entirely by signals, and, one arm signals for blocking two blocks or three blocks.

BLOCK SIGNALS.

BY A. M. SCHOYER, GENERAL SUPERINTENDENT PENNSYLVANIA LINES WEST OF PITTSBURG.

The development of train operations has run the gamut from simplicity, through endless precautions, back to simplicity.

When railroads were first established in this country, the sole precautions taken to operate trains safely consisted in the time table, with its necessary instructions. This was afterwards supplemented by the book of rules; this, in turn, by train orders, and this, in turn, by block signals; so that a few years ago, in order to operate trains safely, we had the time table, book of rules, the train order, and the block signal. The block signal has gradually taken the place of the time table and the book of rules, and the American Railway Association now proposes that it shall take the place even of the train order, so that the most advanced railroads of the country will, no doubt, in a very short time operate their trains solely and exclusively by block signals.

The time block, or spacing block, which was the first introduced in the country, and which is still in use on many railroads, especially single track railroads, provided for the spacing of trains at the telegraph towers, by the operator. On many of the important railroads of the country, as the traffic grew denser, it was found that the principal of the time interval block was wrong, and that accidents frequently resulted from its operation.

A few years ago the Joint Train Rules and Safety Appliance Committees of the American Railway Association went over the entire block signal matter and evolved three sets of rules.

One for the manual block, which is the common telegraph block.

One for the manual controlled, where the signalman is locked up and cannot, under ordinary circumstances, permit two trains to be in one block at the same time; and

A third set for the automatic block.

When the manual block was first introduced on some of our more important railroads it was felt that we had taken an immense stride in the direction of safety. On some railroads the manual block was an absolute block for all trains. On most roads, however, it was an absolute block behind all passenger trains, but was a permissive block behind freight trains, and the result of a combination of this kind meant that there were still freight wrecks and occasionally, through the mistake of an operator, there were passenger wrecks as well.

The manual controlled system eliminates the personal equation to a certain extent, while it retains the benefits of the thinking operator. By means of this system the apparatus is locked up, as stated above, so that after one train has entered the block another cannot be admitted until the circuit is released by the operator at the other end. On several very important railroads of the country this system is now in effect, and is said to be quite reliable. It is expensive, in that it not only includes an expensive maintenance, but also a great expense for operation, the large number of operators scattered along the road being men of judgment; hence, high-priced men. It was also found necessary to provide arrangements for releasing the system when trains were in the block, and, with the provisions which have been officially made and the provisions which the operators themselves have unofficially made, the system is not entirely safe.

The automatic block gives the train full information as to the location of the trains ahead, and, given enginemen of average carefulness, is absolutely safe. The usual provision of such a system is to couple two blocks together, so that an engineman approaching a bridge or signal receives information.

1. As to the condition of the first block in advance; and
2. As to the condition of the second block in advance.

In some particularly dangerous places, such as descending grades, etc., a third block is also connected in, so that the engineman will also receive information as to whether or not the third block is occupied. Any engineman coming to a bridge and finding that the first block is occupied, is required to stop; on some railroads this stop is for the duration of one minute, on others for two minutes, as the density of traffic may require. After stopping the length of time required, the train is then permitted to proceed, running carefully and expecting to overtake the train just in advance. In some systems of signalling the information with regard to the second block is conveyed by a second arm, while the information with regard to the third block is conveyed by a third arm. There are systems in use, however, to-day where all the information is given by one signal, which, when it stands in the danger position, indicates that the first block is occupied; when in the caution position, that the second block is occupied; and when in the clear position, that both blocks are clear. This system, however, has been made to apply to a third block, by requiring that when either the second or third block is occupied, the signal shall be in the caution position.

An engineman receiving information that either the second or the third block is occupied, must at once reduce speed and get the train under control prepared to stop at the next signal, if it should be at the danger position.

Even with the automatic block, however, accidents have occurred, caused, at rare intervals, by failure of the signal mechanism; but signal failures are becoming more and more rare as the manufacturers are better able to perfect the mechanism.

The principal causes of accidents appear to be:

1. By enginemen disregarding the rules, and either not stopping at the danger signal or not getting the train under control when advised to do so by the caution signal.

2. By enginemen mistaking the signal on the adjoining tracks for the signal on the track on which they are running.

3. By the signals being obscured by snow or other weather conditions, and the engineman taking chances.

In order to overcome difficulties of this character, the inventors have tried several devices. Several years ago, when the Chicago World's Fair was in progress, the Rowell-Potter signal was used on the elevated railroad on the Fair Grounds. This signal, with the additions which have been made to it since, consisted of a device which, when the engineman was about to run by a danger signal, applied the air brake in the emergency and shut off the steam. The apparatus is effective under many conditions. It is not, however, entirely safe for a large and fast moving train to be suddenly brought to a standstill, as is the case when the air is thrown on the emergency, so that this system has never come into general use.

The Miller signal, a novel invention, and which is in use in several dangerous localities, consists of a light in the cab, which shows white when the block is clear, and red when the block is occupied. It may be found possible to use this signal to great advantage at many points.

After all, however, whether we have the manual block, or the manual controlled, or the automatic, or the Miller, or whether we make them all safer by the use of the Rowell-Potter, or some similar device for stopping the train, the whole thing comes back to the fact that unless our enginemen absolutely regard the signals and the rules governing them, no system of block signalling in the world will eliminate accidents.

A few years ago, it was thought that signals could not be placed too close together, and the consequence was that in the adoption of any up-to-date block signal system, the signal stations were placed at intervals of from one-quarter to one-half mile. It has been found that with very fast trains, the engineman must be under a strain constantly on account of the frequency of these signals, and that they really react on the speed of the trains. The tendency to-day, therefore, is to place the signals as far apart as is consistent with the number of trains which must be moved over the territory in a given time.

All of the gentlemen present are no doubt familiar with the action which the American Railway Association has recently taken with regard to the operation of trains on double track, when running with the current of traffic, entirely by block signals. This application of block signals is not original with the American Railway Association, as the Chicago, Burlington and Quincy Railway, the Pennsylvania Railroad, the Pennsylvania Lines West of Pittsburg, the Big Four Railway and several others have been practically doing this for the past two or three years and, so far as I am able to learn, with great success. All this does is to permit trains running with the current of traffic on double track to proceed until the telegraph operator, by signal, advises them to clear the main track. It should involve some expense for interlocking, but the saving in operations is very great, as it keeps the long freight trains moving steadily up to the very last moment and eliminates the delay in stopping for orders, as well as the dead-time which elapses between the time when a freight train running ahead of a passenger train clears the main track, assuming that the passenger train is on time and the time when the passenger train, running a few minutes late, actually passes. Under the new order of things, the train dispatcher, having the entire matter under his own control, is able to keep the long freight train moving up to the very last side track and to put it on the side track in time to be passed by the passenger train without delaying either train appreciably.

I might say, without violating confidence, that the Train Rules Committee of the American Railway Association proposes, at the April meeting of the Association, to present a set of brief rules authorizing the movement of trains on double track, against the current of traffic, by the use of block signals and eliminating time table rights, book-of-rules superiority, and train orders entirely. The signal will be the instructions to the engineman and conductor as to how to proceed, and they will depend absolutely on the signal. This is an original step by the American Railway Association, as there are probably no railroads in the country which are today operating in this manner.

To equip a railroad to so operate, of course, will be expensive, as it will require that proper signals shall be placed at all crossover points regulating not only the crossing over of a train, but its approach to the crossover so that the engineman may have the train under proper control in time to crossover with safety and comfort.

There is a subject in connection with the block signals which has not been settled satisfactorily; that is, the question of night signals.

It has been generally appreciated by the railroad men of this country that white is not a good safety color, because of the fact that the railroads are surrounded by white lights of all descriptions; and further, because of the fact that a broken lens in a colored lamp may cause a safety signal to be given, when a danger signal is intended. Many railroads have now adopted red for danger, yellow for caution and green for safety. There are serious objections to the use of green for safety, the principal one of which being that the safety signal on high-speed railroads should be given to the engineman as far in advance as possible, so that he may maintain high speed, and we all know that in the green signal a large number of the rays of light are absorbed, so that the signal cannot be seen for any great distance. There is also an objection to the use of yellow for a caution signal on railroads which use a permissive block, or on railroads which have but one signal to indicate the condition of two blocks in advance. It is very difficult to distinguish the yellow from the red where they are used in the same locality or on the same signal mast. On railroads which do not have any permissive block, or which have separate signals for separate block, the yellow can be, and undoubtedly is, used to considerable advantage; but on all other railroads the possibility of mistaking a red signal for a yellow signal involves so many chances of accident that it would seem proper to pursue the investigation further as to whether, after all, something better than a colored light cannot be evolved to indicate night signals. An illuminated blade has, of course, been tried and has failed. The practice of placing two or three lights on the semaphore blade has been tried, with moderate success. It would seem that our up-to-date inventors should be able to work out some system which will enable us to use position by night as well as by day. It has been suggested that minature search lights might be used and signals indicated by rays of lights thrown in the various positions; it has been suggested that the use of the electric headlight on locomotives would render useless colored lights by night; it has been suggested that by erecting one or two arc lights at every tower the situation might be so illuminated that no other lighting would be necessary. The latter of these suggestions would seem to be practicable and without too great expense, and might solve the problem.

The block signal has evidently come to stay, but in order to make it absolutely safe, a thorough campaign of education must be inaugurated on all railroads; enginemen must be taught to obey implicitly the language of the signals: signalmen must be taught to implicitly obey the rules laid down for the display of the signals, while train dispatchers must use judgment and foresight in their instructions to the signalmen with regard to the movement of trains.

In connection with this subject I trust that members of the Club will read and digest a paper on Railway Accidents in the United States and Europe, by Slason Thompson, which came into my hands only to-day.

It conclusively settles the mooted point that European, and especially British, railroads are so much more safe than our own.

I desire, however, to call your especial attention to Mr. Thompson's conclusive remarks: "The best physical means to prevent collisions is to increase the double track mileage. Next to this comes the block signal system * * * * * * * But no physical or mechanical contrivance can protect such a system of transportation as the American people demand from the direful effects of human negligence and incompetence. Discipline carried to the point where obedience to signals is involuntary must eventually become the reliance of the American railway system. This discipline can only be practically effective when the authorities responsible to the public are untrammeled in its enforcement by any secondary responsibility.

When it becomes as unheard of for an official to pass over a breach of discipline as for an engineer to pass a danger signal, the rational safety of American railway traffic will be assured."

I am glad that Mr. Thompson, from a statistical and theoretical standpoint, arrives at the same conclusions that I have reached from a practical one. We must have absolute discipline to insure anything like absolute safety in operations.

President: Gentlemen, you have heard this most excellent paper; it is now open for discussion. It being a purely transportation matter, we have many gentlemen here to-night who can talk upon it, and we ought to have a full discussion.

Inasmuch as it was presented by a General Superintendent, it is very fitting to have the discussion opened by one, and I will ask Mr. J. B. Yohe, General Superintendent of the Pittsburgh & Lake Erie Railroad, to open the discussion.

Mr. J. B. Yohe: Mr. Chairman and Gentlemen—When I first learned that a paper of this character was to be presented by my friend Mr. Schoyer, I began laying plans to be present on this occasion. Therefore it is exceedingly gratifying to me to be present here at this time and listen to the paper as presented by Mr. Schoyer. I had hoped to be able to prepare something in the way of discussion of this most able paper, but by reason of its not being placed in my hands until a day or two ago, and the further reason that I have been engaged in court all week, I have been unable to prepare anything.

Had you searched the railway world from east to west, from north to south, in your efforts to secure the man most competent to prepare and present a paper of this kind, I feel sure that you could not have secured one better qualified than Mr. Schoyer. He is a member of the Train Rule Committee of the American Railway Association, which is the most important committee of the most influential railway association in the United States, and I dare say in the world. I have heard him speak frequently on the floor of the American Railway Association, and therefore feel that I am qualified to pay this compliment to Mr. Schoyer. And I also feel that any discussion on my part, of the paper as presented by him might spoil the effect of that paper, and for that reason I prefer not to discuss it.

I will remark, however, that my first recollection of block signaling was back in the early seventies, on the Baltimore and Ohio road, under the management of Mr. E. K. Hyndman, a relative, I believe, of the Vice President of this association. A green and white signal on a flag staff was placed in the hands of each track walker and after a train passed, freight or passenger, the track walker going over his section would display a green signal to following trains for five minutes, and after the expiration of five minutes he would display a white signal. To an old-time Train Dispatcher of the seventies, who was obliged to invent as well as apply means for the safe movement of trains, the mode of signaling in vogue at that time as compared with the most radical departure of the American Railway Association in moving trains, not only with the current of traffic, but against the current of traffic, by block signaling is almost beyond comprehension.

I believe that Mr. Schoyer has covered every point of railway signaling in existence up to this time, and we know that he has gone a step farther in giving us information as to the next step to be taken by the Train Rule Committee of the American Railway Association in that direction.

Mr. President, I congratulate you upon selecting for this occasion a gentleman who is an acknowledged authority on block signals.

President: I believe Mr. E. M. Herr is present and can say something upon this subject.

Mr. E. M. Herr: Mr. President—I have nothing that I can add to this discussion. I can join with the gentleman who has preceded me in saying that I have listened with a great deal of pleasure and interest to the very able paper which has been read this evening. The matter of signaling is a little out of my line, or at least out of my present line of work. I remember, though, with a good many interesting reminiscences, of some of the times in the seventies when I was in that branch of the railway service where, while I did not have so much to do with the arrangement of signals, I had with the operating of them.

President: Mr. Herman, can we hear from you?

Mr. R. Herman: This being the first night I have been fortunate enough to be with you, and as I am a manufacturer of appliances of that kind, it would seem a little out of the ordinary for me to talk about signals. Some folks like three position signals, others like two-arm home and distant signals and some of them do not like signals at all. I followed very closely what Mr. Schoyer said in his talk in regard to signals, and I must agree with Mr. Schoyer very heartily that the automatic block signal has evidently come to stay. There has been a great deal of time and study spent in the improvement of automatic electric signals, and it is my opinion that all railroads using these appliances are convinced that it is the safest way of operating trains on a busy road. My main object has been for the last four years to improve the automatic signal. I furnished the signals for the Fort Wayne and Chicago Railroad, which was really the first largest installation of the three position electric automatic block signal in the United States. The experience gained in the manufacture of these signals led me to improve on the three position idea, and have since brought out what is known as the Herman Standard Signal, which differs in its operation entirely from any other signal that has been so far introduced. Gentlemen, you may think that I am advertising my signal, but I am not. [Laughter.] The Herman Standard Signal differs from any other signal in this respect—that it is not necessary for the semaphore arm to go to its predetermined position in order to assume the new indicated position, or in other words, it is not required that the movement that has already begun should be completed before the signal can operate to its new and correct position. The signal is operative in any part of its movement, which is not the case in any other electric signal. The next thing I took up was the maintenance of signals. You all know that the operation of electric automatic signals and the expense of maintaining the same is a very serious question. I, therefore, perfected a direct-driven electric semaphore signal which will cut down the expense of current consumption two-thirds. In other words, it will make nine hundred signal movements with the same amount of current against two hundred and fifty movements of the present type of signals, thereby reducing the expense practically to one-third. It further facilitates faster train movement, as it only requires from four to five seconds to clear the signal and making a movement of ninety degrees. It will move to the green position in two seconds.

Gentlemen, I thank you very much for calling on me, but I really feel out of place talking electric signals, as I know that I am a signal crank; when you get me started I do not know when to stop.

Thanking you again for the honor.

President: Mr. Johnson, can we hear from you?

Mr. Sidney Johnson: I also represent a manufacturing business, so I feel somewhat in the same predicament as Mr. Herman, and I feel that I am not here to advertise an apparatus, and a misconstruction might be placed on my remarks. But I would just like to say that I think there are other signals on the market besides Mr.Herman's. [Laughter and applause.]

President: We would like to hear from Mr. Scovell.

Mr. W. N. Scovell: I fear I have nothing of any value to say on the signal question to-night, but I would like to make one observation on the address and the interesting table of statistics as to the comparison of numbers killed in this country and on the European roads. These statistics, as I understand it, seem to be founded entirely on the mileage of the roads, and I think that is an unfair basis of comparison. It is a pretty well known fact that in this country there are thousands of miles of road on which a very few trains run in twenty-four hours; but if you take the roads of Great Britain or Belgium or Holland or France, almost any European country, you will find, as a rule, that the traffic is very dense indeed. I do not know what the comparison would be, taking the average of all the railroads of Europe, but I imagine it would not be unfair to say that probably the density of traffic would be 10 or 20 to 1 as compared with the United States; 15 or 20 to 1, I dare say, would be about the ratio. And I think that in order to get any value out of these statistics of accidents we ought to take into consideration the train mileage. Until that train mileage is presented in connection with these statistics I do not believe they have very much value, and I do not think it would be altogether safe for American railroad men to congratulate themselves on the relatively small number of people they have killed on their roads in comparison with European roads.

Furthermore, in that table of statistics we have figures relating to the large number of trespassers and suicides on American roads. I will be bound to say that a great portion of those trespassers were people using the common highway running from the streets, and they are not in a proper sense, tresspassers, but people using a traveled grade crossing. It is well known that a great many people are killed at level crossings.

Now, that is not exactly on the subject of railway signals, but it is only right to point out in relation to these statistics that they will bear investigation and going into thoroughly by any one who wishes to use them.

President: Gentlemen, there is another class of men beside the operating officials and the gentlemen who have signal systems to sell who are interested in the subject. We have with us to-night one of our members who formerly hauled the Congressional Limited on the Pennsylvania Railroad, one of the finest and fastest trains in the world. We would like to hear from Mr. Currie.

Mr. J. C. Currie: Mr. President and Gentlemen—I have listened with a great deal of interest to the reading of this very able paper on the topic of signaling systems of various kinds, and it recalls to my mind many pleasant memories of my railroad life. I believe I have watched the progress of the block signal system from 1872 up until very near the present time. I remember the old box Banner system, with a light inside and a red and green curtain controlled by the operator, the box sitting directly over his window. Then we got the semaphore blade. Next two blades on one pole, one for the east-bound and one for the west-bound. And many a time the engineer on a foggy night could not see across the railroad to that pole to know whether his signal was red or white. Finally we got a pole on each side of the right of way, and that helped us somewhat. And so we have progressed through all these years until to-day we have automatic electric railway signals. And I want to say, and I think I can say it without fear of contradiction, that it is one of the best, if not the safest, system of signals that the engineer has had to guide him. There are the bridges built directly across the tracks with the signals directly over the track on which he is running, with the two blades, as we know them, the distant and the home signal. With two trains, the one following the other, the engineer on the second train can determine very easily how fast the train ahead of him is running, and he can so regulate his speed that he can just about keep the same speed as the train ahead of him by watching the arms drop or lights uncover in front of his train. If he finds that the blades are a little slow in dropping, or the lights a little slow in showing white, he is simply going a little faster than the train ahead of him, and by simply slowing a little he gives the man ahead of him a chance to clear these signals before he reaches them, and that relieves him from the necessity of stopping.

I can remember away back in 1872 the first improved interlocking system of signals and switches that was installed on the Pennsylvania Railroad. I say this advisedly, but I believe it was the first. That was at East Newark, N. J. We had no pointed switches previous to that time, and no interlocking system of signals and switches. That Pennsylvania signal system was installed by an English company. I remember very well the installation of that system of signals. The signal pole, the semaphores, the switches, everything connected with that installation, was imported from England and erected by English workmen with an English foreman. That tower and system of signals and interlocking switches was installed, as I say, in 1872 or very early in 1873, and it has been in steady operation until about a year ago, when the tower and signals were removed owing to the elevation of the tracks through Newark and East Newark, and became a thing of the past.

So that to the engineer the question of signals is a valuable and a serious one. And I want to say to you, gentlemen that the more valuable you can make your signal system the better it is for the men in the cab, the better it is for the traveling public and for the railroad officials. And I want to say, as I said before, that the automatic electric signals seem to me to be the safest signal that I have been privileged to work with.

I thank you, Mr. President, for calling upon me. I hardly expected the honor. I have not been railroading for some years, still I keep in close touch with it and the members of that profession are always very dear to me.

President: Are there any further remarks? If not, I will declare the discussion closed.

Mr. Hyndman (Vice President): I move that this Club extend a vote of thanks to Mr. Schoyer for his very able paper which he has presented here to-night.

The motion being duly seconded, was carried amid applause.

President: Mr. Schoyer, it gives me great pleasure to extend to you the thanks of this Club.

President: There being no further business to come before the meeting, a motion to adjourn will be entertained. The Committee on Entertainment have arranged a little something on the side, to take place after adjournment, and we would be very glad to have you all stay and enjoy it.

On motion, adjourned.

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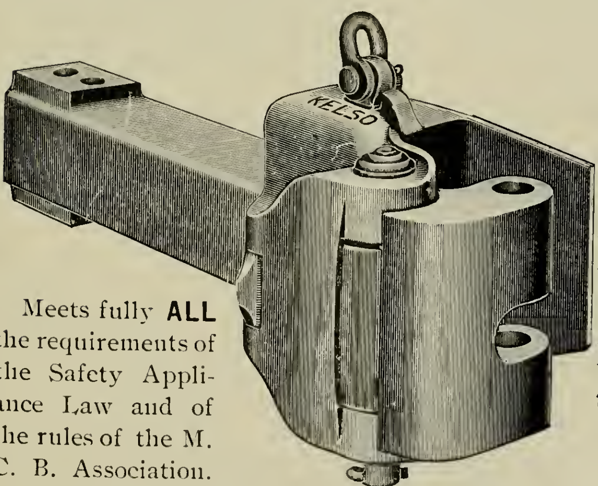

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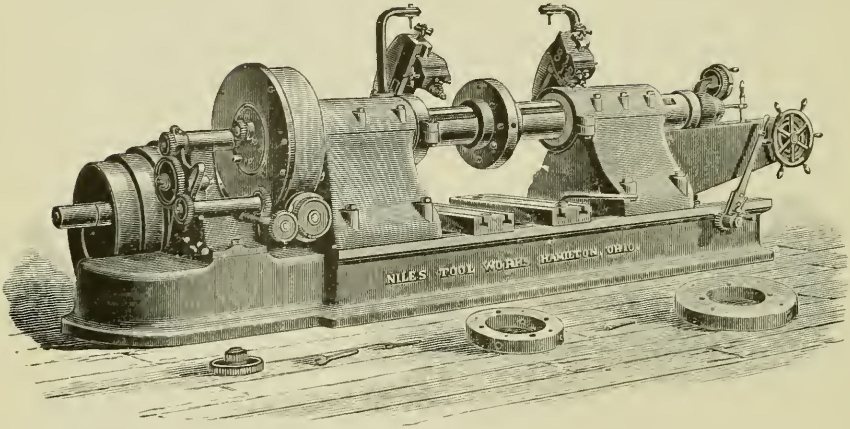
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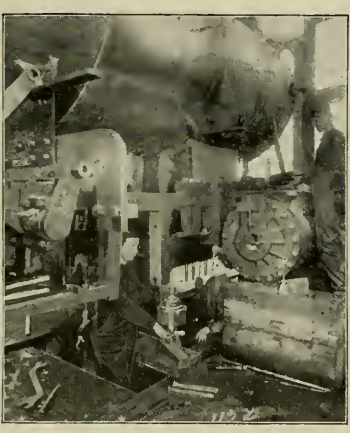

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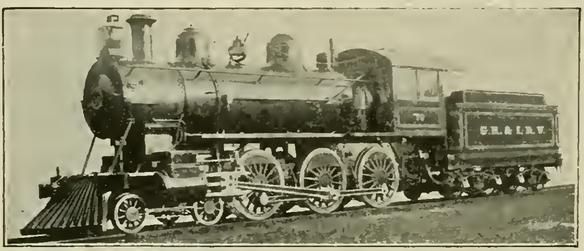

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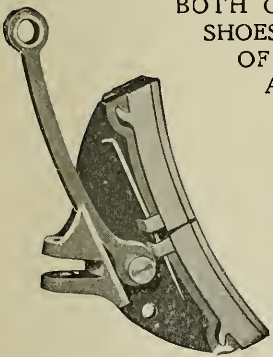

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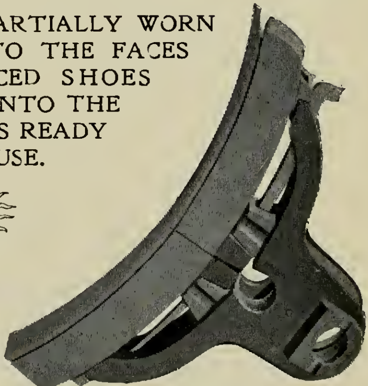

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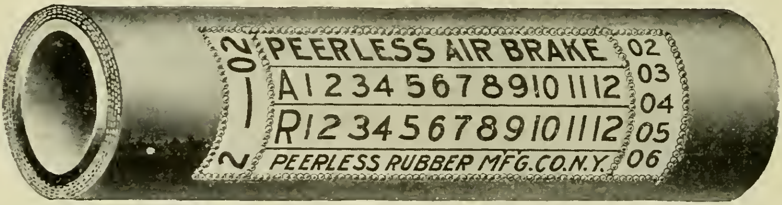
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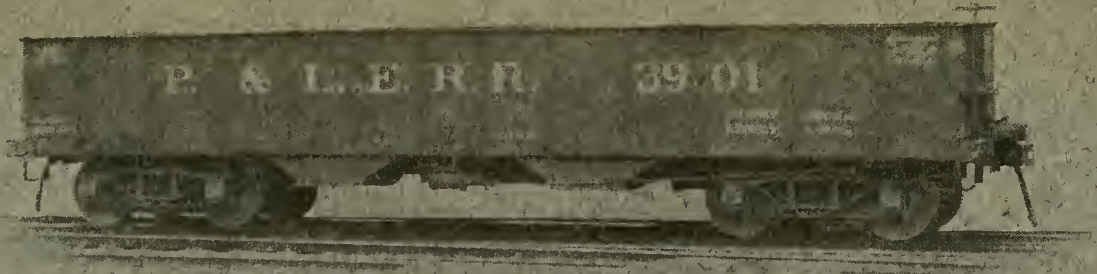

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Classified Index of Advertisements

Air Brakes—
Westinghouse Air Brake Co... ix

Air Compressors—
Chicago Pneumatic Tool Co.......... xiii
Manning, Maxwell & Moore............ xv

Babbit Metal—
Damascus Bronze Co., Inside front cover
Lawrenceville Bronze Co.,.............. xi
Magnus Metal Co.,.................... vi

Belting—
J. D. McIlwain & Co.,...................... x
Hukill-Hunter Co.,.......................... xvi

Boiler Washers and Testers—
Nathan Manufacturing Co.,............ iv

Boiler Lagging—
Franklin Manufacturing Co............ xv

Boiler Tubes—
National Tube Co.,..................... v

Bolsters—
Pressed Steel Car Co.,......................
Outside back cover

Brass and Bronze Castings—
Damascus Bronze Co.,.....................
Inside front cover
Lawrenceville Bronze Co.,............... xi
Magnus Metal Co.,.......................... vi

Brake Shoes—
American Brake Shoe & Foundry Co. ii
Hukill-Hunter Co.,.... xvi

Car Couplers—
Gould Coupler Co.,.......................... ii
McConway & Torley Co.,................. xi
National Malleable Castings Co.,..... vi

Car Heating and Lighting—
Gold Car Heating Co.,..................... vi
Safety Car Heating and Lighting Co. xiii

Castings—Malleable Iron—
National Malleable Castings Co.,..... vi

Coal and Coke—
Washington Coal and Coke Co.,....... xii

Conveying Machinery—
J. D. McIlwain & Co.,..................... x
Manning, Maxwell & Moore............ xv

Corner Bands—
Pressed Steel Car Co.,......................
Outside back cover

Drills—Twist –
Cleveland Twist Drill Co.,................
Inside front cover

Friction Draft Gear—
Westinghouse Air Brake Co.,........... ix

Graphite—
Jos. Dixon Crucible Co..................... vi

Hoisting Engines—
J. D. McIlwain & Co.,...................... x

Hose Clamps—
J. D. McIlwain & Co.,...................... x

Injectors—
Nathan Manufacturing Co.,............ iv

Jacks—
J. D. McIlwain & Co.,...................... x
Hukill-Hunter Co.............................. xvi

Journal Bearings—
Damascus Bronze Co.,....................
Inside front cover
Lawrenceville Bronze Co.,...... xi
Magnus Metal Co.,.......................... vi

Locomotives—
American Locomotive Co.............. xiv

Lubricators—
J. D. McIlwain & Co.,......... x
Nathan Manufacturing Co.,............ iv

Machine Tools—
Niles Tool Works............................ xii
Manning, Maxwell & Moore........... xv

Magazines—
Railway Age.................................. iii

Malleable Iron—
Fort Pitt Malleable and Grey Iron Co...xvii

Oils—
Galena Signal Oil Co.......... xvii

Oil Cups—
Nathan Manufacturing Co.,............ iv

Packing—
J. D. McIlwain & Co.,...................... x
Franklin Manufacturing Co.,.......... xv

Paints—
Sherwin—Williams Co.,.................. ii
The Lowe Brothers Co.,................... xvi
M. B. Suydam Co. i
Chas. R Long, Jr........... iii

Paint Machines—
J. D. McIlwain & Co.,...................... x

Pipe and Pipe Fittings—
National Tube Co.,.......................... v

Pipe Joint Paste and Compound—
Jos. Dixon Crucible Co................... vi

Pneumatic Tools—
Chicago Pneumatic Tool Co,.......... xiii
Manning, Maxwell & Moore............ xv

Pulleys—
J. D. McIlwain & Co.,...................... x
Hukill-Hunter Co.,........ xvi

Reamers—
Cleveland Twist Drill Co.,................
Inside front cover

Rubber Goods—
Peerless Rubber Mfg. Co.,............... xvi
Hukill Hunter Co.,.................. xvi

Safe Ends for Boiler Tubes—
National Tube Co.,.......................... v

Index—Continued.

Side Stakes—
Pressed Steel Car Co., ... Outside back cover

Spring Buffer Blocks—
Gould Coupler Co., ... ii

Stay Bolt Iron—
B. M. Jones & Co. xiv
Sligo Iron & Steel Co. xviii

Stake Pockets—
Pressed Steel Car Co., ... Outside back cover

Stay-Bolt Taps—
Cleveland Twist Drill Co., ... Inside front cover

Steam Fire Extinguishers for Locomotives—
Nathan Manufacturing Co., ... iv

Steel Tires—
Latrobe Steel Co., ... iv

Steel Tired Wheels—
Railway Steel Spring Co. xiii

Springs—
Railway Steel Spring Co. xiii

Steel Cars—
Pressed Steel Car Co., ... Outside back cover

Steel—Mushet's—
B. M. Jones & Co. xiv

Tools—
Cleveland Twist Drill Co., ... Inside front cover

Trucks and Truck Frames—
Pressed Steel Car Co., ... Outside back cover

Valves—
Homestead Valve Mfg. Co. iv

Varnishes—
Sherwin-Williams Co., ... ii

Weldless Steel Flanges—
Latrobe Steel Co., ... iv

Wheels—
National Car Wheel Co., ... Inside front cover

Wooden Cars—
Pressed Steel Car Co., ... Outside back cover

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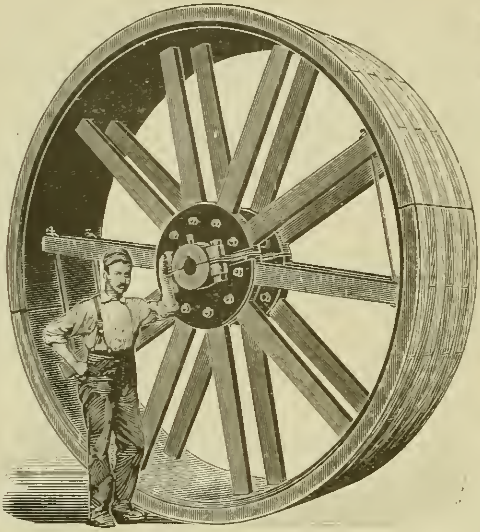

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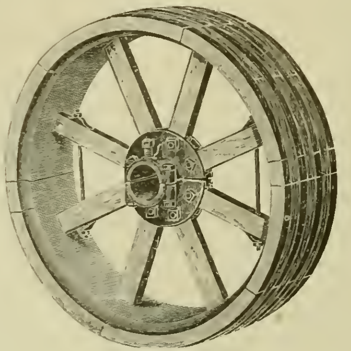

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Meetings held fourth Friday each month, except June, July and August.

PROCEEDINGS OF MEETING,
MARCH 25th, 1904.

The meeting was called to order at 8 o'clock P. M., at Hotel Henry, Pittsburgh, Pa., with President L. H. Turner in the chair.

The following gentlemen registered:

MEMBERS.

Allen, J. P.
Barnsley, Geo. T.
Brittain, Jno. B.
Brown, Jno. T.
Carson, G. E.
Chittenden, A. D.
Conway, J. D.
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Hall, W. G.
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Huntley, F. P.
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Keppel, A. M. Jr.
Kerr, Geo. M.
Knight, E. A.
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Laughlin, C. W.
Lee, L. A.
Long, R. M.
Lynn, Samuel.
Malloy, M. A.
Milligan, Jno. D., M. D.
Milliken, I. H.
McConnell, C. H.
McFeatters, F. R.
McIlwain, J. D.
McMullin, F. V.
Pelletier, Louis.
Proven, Jno.
Quest, W. O.
Redding, D. J.
Reese, E.
Richardson, W. P.
Shannon, Chas.
Shupe, C. W.
Sproat, H. H.
Stark, F. H.
Stucki, A.
Sweeley, G. P.
Taylor, H. G.
Turner, L. H.
Van Tine, H. C.
Warne, J. C.
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Mitchell, J. H.
Peach, W. M.
Quest, F. E.
Roberts, R.
Reynolds, O. H.
Smith, Sion B.
Streicker, Charles
Tate, B. M.
Wood, E. Robt.

President: The minutes of the last meeting are being printed, the reading of them may be dispensed with.

Secretary Conway read the following proposals for membership:

A. La Mar, Assistant General Car Inspector, Pennsylvania Lines—N. W. System, Fort Wayne Ind.

James Gratten, Foreman Painter, B. R. & P. Ry. Co., DuBois, Pa.

Geo. T. Sipe, Treasurer Jas. B. Sipe & Co., 400 Federal St., Allegheny, Pa.

F. E. Quest, Rep. Cleonola Co., West Diamond St., Allegheny, Pa.

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J. D. Cunningham, Sales Agent, New York Car Wheel Co., Allegheny, Pa.

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Chas. Streicker, Asst. Supt. Mfg. Dept. Standard Steel Car Co., Butler, Pa.

O. B. Street, C. C. to S. M. P., B. & O. R. R., 67 Hazelwood avenue, Pittsburgh, Pa.

Arthur Morgan, Chief Clerk to G. Y. M., P. & L. E. R. R., Haselton, O.

C. F. King, Yard Master, P. & L. E. R. R. Co., Haselton, Ohio.

Wm. A. Stone, Agent, P. & L. E. R. R. Co., McKeesport, Pa.

President: As soon as these names have been favorably acted upon by the Executive Committee, the gentlemen will become members of the Club.

The paper for the evening is on Terminal Cleaning of Passenger Equipment Cars, by Mr. J. D. Wright, General Foreman Painter of B. & O. R. R. Co., at Baltimore.

TERMINAL CLEANING OF PASSENGER EQUIPMENT CARS.

BY MR. J. D. WRIGHT, GENERAL FOREMAN PAINTER, B. & O. R. R. CO.

Mr. President and Gentlemen of the Pittsburgh Railway Club.

The cleaning of Passenger Equipment cars at terminal stations is a subject which is, I believe, deserving of more thought and study than it usually receives. Cleaning is lowly work, and it would seem, at first glance, that such ordinary labor could be performed satisfactorily by any one who was willing to undertake it. But this is not the case, for the laboring classes are not all educated to see dirt, many of them live amid surroundings that do not teach the virtue of cleanliness, and for this reason they are not all fitted for the work. And in these progressive days of germs and microbes there is more than dirt to fight. Modern methods of scientific investigation along lines related to sanitation are educating the general public, and there is to-day a growing demand for improvements in the sanitary condition of public thoroughfares, buildings and vehicles. In order to meet these demands and secure satisfactory results, some one of intelligence must direct the efforts of the uneducated labor which is usually employed to perform this work.

The work of the car cleaner is closely connected with the work of other departments over which he has no control, and, frequently, very little influence. On account of this I wish to present a few points regarding his relations with them, which, to him, are of great importance.

First of all, shall we look at the equipment he is given to clean by the car department. It is frequently full of carvings, mouldings, corners and inaccessible places which render his work arduous and unsatisfactory. Some of the above features are designed for ornamental effect, but are they beautiful when they are not clean? In my opinion they are not, and, furthermore, they cannot be cleaned with economy. I sometimes think it would be a good plan for the passenger car designer to take a course in practical car cleaning, as it might result in the construction of cars that would be just as serviceable but more easily kept clean and in sanitary condition.

From the car cleaner's point of view, the interior finish should be plain, without carvings, fancy mouldings, etc., and with as few ledges as possible to catch soot and dirt. There should be no inaccessible places. The steam pipes should be covered, or so arranged that they will not catch and hold filth, or interfere with the cleaning of the floors. The toilet rooms should be large enough for the purpose for which they are intended, and so arranged that the wood work will not become foul and emit bad odors. The closets should be located so that the trucks and safety chains will not become foul. When double window sash are used, there should be sufficient space between, or they should raise to a height which will permit the glass to be cleaned with ease. The outside body should be plain to facilitate wiping; the beads should be shallow, battens oval shape, or have round edges; all unnecessary battens (such as those between the windows) might be left off the car entirely, and corners should be eliminated where possible. It would also prove one of the greatest blessings to him, as well as the traveling public, if some form of seat cushion could be produced which would be more sanitary and more easily cleaned than the plush covered seat now in general use.

Of course, we understand that cars are designed for service, with a view to the comfort and luxury of the passenger, and not merely to be cleaned. However, the cleaning is an operation which is repeated frequently while cars are in service, and anything that will facilitate the work or reduce the cost, without sacrificing utility or beauty, will prove advantageous. I am glad to add in this connection that a plainer finish for car interiors is growing in favor, and I believe you will agree that this is a step in the right direction.

Another important point to the car cleaner is the character of the yards in which the cars are cleaned, and in this he is dependent upon the Maintenance of Way Department. There are a few yards which are suitable for this purpose, but the idea seems to prevail at many terminals that cars can be cleaned anywhere, regardless of the conditions existing between the tracks, or the close proximity of passing trains. The car cleaner's idea of a suitable yard is one having sufficient standing room for all the cars to be cleaned, situated on land that can be easily drained and so located that there is no danger whatever from passing trains. It should be equipped with steam, water and air pressure pipes throughout; also suitable racks for cleaning carpets, cushions, mattresses, bedding, etc., with facilities for conveying them to and from the racks. Suitable buildings should be provided for the storage of material and tools, and rooms for the comfort of employes, containing clothes lockers and lavatories. A shed large enough to cover two or three cars is a great help in bad weather, but this is not an absolute necessity.

If the care of cars at terminals was a temporary matter, the location of the yards and the conditions and facilities would be of little importance. However, passenger trains will continue to run and be cleaned as long as railroads exist. In the light of these facts, it would appear that the terminal cleaning of cars is entitled to some consideration in the way of permanent yards and facilities.

The third point of vital interest is the movement of equipment to and from the yards, and in this the cleaner is entirely at the mercy of the Transportation Department. Willing and hearty co-operation between this department and the car cleaner is needed at all times in order to insure results that will be entirely satisfactory. He depends upon this for his regular supply of work, for sufficient time in which to do it properly, and the systematic handling of his forces. Without prompt and regular movement of cars, the cleaners lose time awaiting work; as a result of this the cleaning is then hurried and done in a slip-shod manner. Furthermore, there can be no systematic organization of the cleaning forces. There are, of course, unavoidable delays caused by the lateness of trains, for which there is no remedy, but to this we do not refer. Nothing is gained, however, from the car cleaner's point of view by holding three trains in the station which arrive on time for the fourth train when it is late, so that all may be pulled to the yards together, especially if this manner of handling the trains deprives him of the necessary time in which to do his work properly. He would prefer to get the three trains at the usual time and keep his forces regularly employed.

We have mentioned the advantages of having cleansable cars, suitable yards and regular movement of cars to and from the yards, with sufficient time to do the work properly, all of which are helpful to the car cleaner, but beyond his control.

We now come to the part of the subject over which he has some control—the work of cleaning. This is somewhat more complicated than one unacquainted with the subject would suppose. In the first place there is a great variety of cars to be cleaned, viz.: Postal, Baggage, Express, Horse, Passenger, Combined, Parlor, Dining, Cafe, Sleeping and Special cars, all of which require somewhat different treatment. Some have carried emigrants and others the most refined travelers, and the cars which have carried the former are sometimes wanted for the latter on short notice. They have made trips varying from ten to over 1,000 miles in length, and through sections of country differing widely from each other in respect to geographical conditions. Each section has its own peculiar effect on the equipment. In mountainous regions this is most apparent in the form of soot and smoke, also sweating, where tunnels exist, on account of extremes of temperature. In sandy districts and in the prairie country it is apparent in the form of dust. In addition, there is rain, sleet, ice and snow to consider, for cars must be cleaned, regardless of the weather.

From these varying conditions it can readily be seen that rules governing the cleaning must necessarily be more or less elastic. With this in mind, the general requirements of cars which have made short trips, less than 100 miles in length, are as follows:

Interior—Raise some of the windows when the state of the weather permits, in order to admit fresh air; remove rubbish; sweep floor and carpets; clean up anything offensive; wash and disinfect closets; clean washstands; dust seat cushions and backs, sills and seat arms; set the window shades to a uniform height, and do any light cleaning necessary to put the car in serviceable condition.

Exterior—Remove anything offensive from the body and trucks; sweep platforms and steps, and wipe the hand rails.

Once in each twenty-four hours when making short trips, or when the aggregate mileage of several short trips exceeds 100 miles, also, when continuous trips have been made exceeding 100 miles in length, cars should receive a thorough cleaning, as follows:

Interior—Raise windows and open doors when state of the weather permits to admit fresh air; remove carpets; dust window shades, seat cushions and backs, ceiling and woodwork; sweep and mop floor; clean washstands and metal work; sponge off window sills, seat arms, foot rests, pipe covers, hopper tops and the lower wood work in toilet rooms with water containing disinfectant; wipe partitions, prominent parts of wood work and interior of wide vestibules where necessary; clean and replace carpets; clean glass and mirrors;

set window shades to a uniform heighth and do any further cleaning necessary to put the car in serviceable condition.

Exterior—Wipe or wash outside body, sash and doors; clean window glass; sweep and wipe platforms, steps and hand rails; wipe trucks, side truss rods, boxes, etc., and polish the brass.

In addition to the above two classes of cleaning, special work which is not necessary at the end of every trip must be done at intervals. The water coolers must be cleaned out occasionally and the dust removed from the window openings, curtains, seat cushions, backs, etc. The ceilings and interior wood work require washing and the outside of the body and trucks need scrubbing at intervals to remove the accumulations of soot and dirt which is not wiped off by the regular cleanings. It is a hard matter to lay down general rules stating definitely how often special cleaning should be done. In the summer time, for instance, when the windows are raised and the ground is dry and dusty, the seat cushions and backs require more attention than they do in the winter months. And on mountainous divisions the car ceilings, interior finish and outside bodies require more special cleanings than similar cars running through open country. As stated before, much depends upon the climatic conditions, the character of the country through which the cars run, and the mileage.

As to the tools and materials required for cleaning, we will pass without comment the ordinary articles in every day use, such as brooms, mops, sponges, etc., but will say a few words on compressed air apparatus, washing materials and car cleaners.

The use of compressed air for cleaning curtains and cushions is a great improvement over hand-beating and brushing, as it does the work more rapidly, and, at the same time, more thoroughly. It is also useful in blowing the dirt out of window openings, corners and places which cannot be reached easily by other methods. It does not, however, dispose of the dust, but merely blows it from one place to another, and its second resting place may be as objectionable as the first.

This bad feature of compressed air cleaning is entirely overcome by the use of a vacuum system having sufficient power to draw the dust to a place where it can do no harm. From the small amount of study I have been able to give this system, it seems to be a great improvement over all other methods now in use, particularly for cleaning curtains, carpets, cushions, etc.

The best materials for washing interior ceilings and wood work is neutral soap and water, applied and washed off with a sponge and dried with a chamois skin. A slight gloss is imparted to the surface of the varnish by the use of an oil soap.

Perhaps the most difficult problem connected with car cleaning is the special scrubbing of exterior bodies, for the purpose of removing the accumulation of soot and dirt. The old-time method of washing with soap and water has been superceded in recent years by the use of ready prepared car cleaners, a large number of which are on the market. Most of these are emulsions having an alkali, acid or abrasive powder as the cleaning agent, with the addition of an oil to prolong the life of the varnish. The efficiency of these cleaners depends largely upon the energy of the workmen, but when handled intelligently some of them give very good results. This seems to be the most popular method of cleaning exteriors at the present time, and has been adopted by a large number of railroad companies.

An oxalic acid solution is also used somewhat for exterior cleaning. Its action on soot is rapid, but it will not remove oil or grease; furthermore, it has the serious objection of leaving the surface dull, due to the crystallization of the acid. The solution does not destroy the life of the varnish, and is used with some degree of success over light colors, when oil and grease are not present.

In conclusion I wish to emphasize the efficiency of hard work, with intelligent local and general supervision. Cleaning cars is not an easy task; elbow grease is needed in abundance to produce results, and labor employed must be directed intelligently to prevent waste of energy.

President: I am not prepared to say how many passenger cars there are in this country that have to be cleaned every day, but it certainly runs up into the thousands, and is a very important part of railway work. Mr. Wright is unquestionably in popular slang "on to his job." And this paper, taken in connection with a good discussion tonight, will give us very good reading in the published proceedings of this meeting.

And I will ask Mr. Stark if he will not open the discussion.

Mr. F. H. Stark: I feel a little diffidence about talking on this subject, especially after reading over this very valuable paper. I know of no person who is more competent to treat this subject than Mr. Wright. It was my privilege to be associated with him for a time, and I know that he is not only able to talk about car cleaning, but execute it.

He speaks in the beginning of the paper about designing passenger cars. Mr. Wright is certainly in a position to understand that subject, for the road he is with has cars that of course are long in use and of various designs. The cars that are now being put on to that road are more modern in design, the interior is plain, with inlaid work for decoration, and the construction of the lower portion of the inside of the car is in keeping. The steam pipes are all covered to keep the dirt and filth from behind the pipes, and pipe hangers, etc., are conspicuous for their absence—thus making it possible to get into the corners and clean out the dirt that is otherwise inaccessible.

I recall when I was with the B. & O. looking over some cars that were to be remodeled, and I found out that this point was being encouraged, the doing away with all "gingerbread" paneling work and everything that made labor for the paint shop. It was the idea to reduce the cost of maintenance of the car after it was in service.

From observation I find that few roads appreciate the importance and advantage of providing proper facilities for cleaning cars. And this applies not only to the cleaning of passenger cars but to the repairing of freight cars, too. I am a strong advocate of sheds for the repair of cars, as well as the cleaning of passenger cars. We all know that a given number of men can accomplish a great deal more work if they are protected from the weather, both in the summer and in the winter time. And it is really surprising to know that the railroad companies give so little attention to that subject.

There is another matter he raises, and that is in regard to the point of transferring cars from the depot to the cleaning shed or track. That is something that every railroad man who has to do with car cleaning has to suffer. Of course there are times when it is not convenient—or possible, perhaps—to have an engine there to move the cars from the depot to the cleaning tracks and to take away the already cleaned cars and put in the cars that are to be cleaned, promptly. But I trust that the transportation people will just make a note of that and think about it.

There are a few details that have come to me within the last few minutes that possibly Mr. Wright might well discuss, that might perhaps enlighten some and confirm the practice of others. I would like to have Mr. Wright advise us whether he would favor washing cars that are just out of the shop; whether he would wash them with water or wipe them with waste or cloth; and if the latter, how long he would allow a coach to be running before he would commence the application of water with the sponge or brush. Then I would like to have him advise how long he would recommend that a coach remain in service, considering the divisions along his line, which we all know is very hard on the coach as far as the effect of the smoke, etc., and the going through tunnels, etc., is concerned. It would be interesting to know how long he would allow a coach to run before he would give it what we call a general cleaning with some special cleaner.

There is one point that is perhaps not of much importance, but I remember one time that we found that the coach cleaners were always flooding the floors with the hose, and after that practice for a few years the sills became decayed, supposedly on account of the floors being wet all the time so that we had to prohibit the flooding of car floors and mopping them out, except baggage cars that were used for fish or something like that, which were permitted to be washed out with the hose occasionally. I would like to know whether it is good practice to flood the floors of baggage cars.

I trust that the members here who are in touch with the car cleaning question will discuss this paper. I am satisfied that it would be very interesting and instructive to us.

President: We would like to hear from Mr. Hindman, of the P. R. R.

Mr. S. M. Hindman: Mr. President, the question of terminal car cleaning I know very little about. But I do say that this is a very valuable subject, and there is no doubt that we often underestimate the value of the car cleaner. Almost any person has the ability to clean up the dirt, if some person points it out to him. There is no doubt about it that it requires a skilled person to explain it to them. But I would rather be excused and let some other person talk about it who is more in touch with the subject than I am.

President: Mr. Carson, will you tell us something about car cleaning?

Mr. G. E. Carson: I do not know that I can enlighten you very much, but I fully agree with Mr. Wright in all he has said. This is a very important subject, and is one that deserves careful consideration. I believe it would not be out of order to comment on some of the causes and necessities of cleaning and scrubbing out cars after every few miles run.

Railroads are putting forth their best efforts to give their patrons the very best of service in the way of accommodations and cleanliness. In fact they stand alone and have very little support from the travelling public when it comes to cleanliness, and their attention is soon called to the unsanitary condition of their equipment, but seemingly they forget that very often the unsanitary conditions are due to the unsanitary habits of the public. When I say this, I do not include all, for there are many exceptions to the rule, but it does very often appeal to me that railroad companies should have, and exercise the right to formulate sanitary rules governing its patrons and no one should give it more hearty support than the traveling public itself.

As to plain interior of coaches, I am pleased to say that our company has already taken the advanced steps by building passenger cars with a very plain interior. It is much easier to keep clean than the former style of cars. Mr. Wright makes mention of the deadly germs and microbes which we all believe should be exterminated on scientific principles. This recalls a little experience I had about a year ago with a certain disinfectant which was to be used in the scrub water and was supposed to annihilate the germ family, and in order to find out its life destroying properties we gathered a quantity of the larvas of insects and poured the disinfectant upon them and had them bathe in it, and they seemingly enjoyed it. After tiring of the experiment we left them in full vigor. The disinfectants in common use to-day carry with them an odor that is not pleasant and to some people is very obnoxious.

President: Dr. Milligan will you talk from the standpoint of good sanitary practice?

Dr. J. D. Milligan: Mr. President, that strikes me. I feel much like the friend of mine who was urged to take a bath. He said he did not want to interfere with his regular methods of life. He had tried it once, but could not be coaxed to do it again.

I think the cleaning of cars is a thing of necessity, and the paper has been a very good one. There was so much covered by the paper. and so very little of the dirt and filth got out of that car without being caught by the paper, that there is very little room for criticism or addition. But I think there is room for a good argument when it comes to the proper disinfection of the car. That means taking out all the microbes that annoy my friend, as well as the coal, dirt, soot, filth, etc., that you find on the floor and around the car.

But it is a fact, gentlemen, that you well know, that the emanations from a pair of diseased lungs will fill any space with bacilli, which are poisonous and diptheric bacilli will be developed in the throat and will be thrown off, and of course must find a lodging place. You know that is true of scarlet fever and of tonsilitis; and we all know it is true of small pox and many other contagious and infectious diseases. Now, you cannot get those "bugs" out of there with anything else than a systematic disinfection, and you have to fall back on formaldehyde to do it with. That means then thorough disinfection. But I do not believe this paper was intended to go into the bug business too far. I believe it meant to discuss general sanitary conditions. But I do think that the addition of a scientific disinfection of cars which have been found by observation to be contaminated, is necessary; I think they should go through a proper process of sterilization and disinfection by somebody who understands his business.

I speak for the Lake Erie in this sense, that in the last year we picked up a number of small pox people and carried them clear over the line North and South. But when it was discovered, immediately that car was sealed and properly disinfected, and no case has ever occurred because of connection or contact with anything of that sort on our road, as far as we know. And it was a matter of considerable moment to us and I have taken great pains to know whether our disinfection was of any use.

There are a great many points to be considered, and going back for a brief review of the paper, I do think that the first step toward clean cars is the same as the first step toward a clean house; do away with all your hanging drapery and get rid of those everlasting plush seats, because there is nothing in the world that will gather up and hold as much dirt and as many microbes as our cushioned seats which we find in all our cars. I mean the plush seat. You can scarcely go into a car and put your hand down on a cushion. I don't care on what company's lines, I am not speaking about any particular company but of all of them—and not find your hand quickly changed in color because of the quantity of dirt that is present. A very good remedy for that is, as Mr. Wright says in his paper, a proper vacuum cleaning system, which draws the dirt out of the coach, not out of the cloth to let it settle over the coach again. That is a good point. I think the vacuum system is the proper method of cleaning cars.

As to the question of my friend here, who has been imposed upon by that man who sold him the bacteriacide, he got that not from microbe but from Latrobe. That is another of the family. It is a query sometimes whether he and the microbe are brothers or not. There is nothing in the shape of a solution that you can make or put on any material, hanging drapery or otherwise, that can destroy microbic conditions.

I do not want to detain you, but I would like to talk about one little point in connection with this that I think worthy to be considered. The paper mentions the fact that "occasionally" the water tank should be cleaned out. Well, now occasionally we don't get our tanks and reservoirs cleaned out up here in the city, and the result is eight or ten feet of mud in them; and we get—well we get a kind of a fluid out of them, but it is not pure water. If you put pure water into a pure retainer you can have pure drinking water. But the retainer is a very essential factor in the case. I remember once carrying some fine trout down in the tank from the north. There was lots of ice on the tank and it kept the fish nice—but I don't know how the water tasted. But we were in Canada and we didn't drink water. My very point is that the tank needed cleaning pretty soon after we took the fish out, and I think that is one of the things that should be very carefully guarded against. Drinking water is like pure air, it is as essential as God's oxygen to keep up a man's life.

Now, I hope Mr. Wright will not take advantage of my far removed attack upon him. I am not attacking him, but there are several little thing that I would say and emphasize, that when done should be thoroughly done and everlastingly done and done all the time; because you cannot keep a railroad car clean, as far as I have found, by even the most exhaustive elbow grease or anything else you can do, without proper sterilization and repeatedly doing it. You cannot keep them any cleaner than the Pittsburgh Railways Company's cars, and you know how clean that is. But they have the proper ventilation, because you know when it is a cold day every ventilator in the car is open. They have the proper cleanliness because they are swept "out occasionally," at least we think so and we ride four or five time a day on them. But there is a very thorough system being inaugurated to take into account the cleaning of the cars of the Pittsburgh Railways Company, and I am very glad to know that such is the fact. And with the cleaning of the reservoirs up here in Highland, we are going to become a clean, pure people, barring our political conditions, which are evanescent.

Thanking you for your tolerance, I will add that I endorse every word Mr. Wright said, but he did not quite satisfy me by pushing the matter far enough. But I think on this assignment Mr. Wright is the proper assignee.

President: The Secretary has a few letters from gentlemen who could not be here tonight. We will hear them read.

Newark, Ohio, March 23rd, 1904.

Mr. John D. Conway, Secretary Railway Club of Pittsburgh,

Dear Sir:—I have received your kind invitation of the 23rd, inst. requesting my presence at your meeting, but regret very much to say, will not be able to be present.

To say that I may be interested is but putting it mildly, as I am indirectly in charge of a good bit of car cleaning. I have very carefully read over the advance copy of paper that will be presented by Mr. Wright, and in my opinion, he has covered the ground very well, especially so in regard to class of labor employed on car cleaning. At a number of points we have foreigners employed on this class of work, and what looks very clean to them, does not show up as such to the traveling public, or to our Supervisors and Passenger Department.

The worst "sore eye" to me is the steam pipes, floors under steam pipes, and around foot rests of seats; also hand railings on the platforms and trucks. On most of our equipment the steam pipes are very close to the floor and are covered with a steam pipe cover between the seats; and between the seats and cover there is a space of several inches where the passengers invariably spit and throw tobacco and cigar stumps, and when the floor is washed or flushed, this becomes caked and often remains in this condition until car goes to shop for repairs. To obviate this, is covered in Mr. Wright's letter by covering up the steam pipes. Often we will find a car body looking first class, but when we inspect iron platform railings, we find them in bad condition; and I hope some of your good members will suggest something that can be applied to these parts that will dry quickly and overcome this bad feature.

In a number of places we clean our trucks with kerosine, and after wiping them down, they look fairly well at the station before the train has started, but do not go but a very few miles until they are covered with dust and smoke, and I would suggest that someone offer a better solution for the care of trucks.

I do not care to take up more of your valuable time, but sincerely hope that your meeting will bring out some good results with respect to our car cleaning, and again expressing my regret at not being able to be present, I am yours,

Very truly,
H. A. BEAUMONT,
General Car Inspector.

McKees Rocks, Pa., March 25, 1904.

Mr. J. D. Conway, Secretary Railway Club of Pittsburgh,

Dear Sir:—I very much regret the fact that I will not be able to be in timely attendance on evening of 25th to hear the presentation and discussion of the very able paper on the subject of "Terminal Cleaning of Passenger Cars," as presented by Mr. John D. Wright, foreman of car and locomotive painters, B. & O. R. R. Co.'s Baltimore, Md., Shops.

The matter of terminal Railway equipment cleaning is a live issue, one of much interest to the railway official, also to the car paint shop foreman.

I am pleased to state that I appreciate and endorse Mr. Wright's paper as a thorough, practical version of the subject; in fact, I think the gentleman handles the matter in such a plain, straightforward, masterly manner as to leave but little argument against his views. As viewed from the practical standpoint, the foreman of a railway car paint shop occupies the peculiar position, which tends to make him a little conservative on the matter of cleaning the interior and exterior varnished surface of passenger cars at terminal points.

The practical, painstaking car painter is fully alive to the fact, there is an element of danger in the hap-hazard cleaning of varnished surface by the usually employed unskilled labor. His practical knowledge of the sensitive nature of the varnished finished structure causes him to hesitate in the advocacy of any material and cleaning method, which to employ means future trouble when passing the sometimes almost totally ruined painted and varnished surface through the shops. Where consulted on the matter of proper materials and method, the painter should know that he in a manner assumes the responsibility for results on all materials recommended. He therefore should never hesitate to turn down a material or method which, in his judgment, after an honest test, will injure any part of the work under his charge.

As stated by Mr. Wright, the use of water and alkali solutions in car cleaning have been pretty generally discarded by a majority of railway companies, from the fact that, regardless of soap strength, they have discovered that such continuous cleaning soon causes varnish and paint deterioration in such a pronounced manner as to raise the question as to whether it is not a truer economy to put up with the grease, dirt and smoke deposits than to resort to such drastic cleaning measures.

The untested, strong, alkali-made soap, water solutions, acid combinations, etc., in our opinion should not be used in either interior or exterior terminal car cleaning. We suggest this material restriction as a safe guard from the fact, as Mr. Wright suggests, there are very few, if any, railway terminal yards expressly fitted up for the purpose of handling the work properly, and as a consequence only the mildest forms of cleaning detergents should be used. With the best of known material and employed skill, the excessive sun heat, the wintry and low damp weather should also be guarded against as being dangerous when handling abrasive cleaning material.

It has been conclusively, and I think satisfactorily, proven that all alkali and acid combined cleaning materials are of an oxidizing nature, and that where not thoroughly removed in wiping off process a hard, dried-on film, or encrusted deposit, is the result, which cannot possibly be removed only by the most drastic grinding, and as a consequence both the elastic wearing life and lustre of all so cleaned varnish is destroyed.

A cleaning material that contains neither alkali, acid nor water is about the only material the foreman of a car paint shop can consistently recommend for all terminal cleaning. The labor used should be strong, energetic and intelligent enough to understand the nature of the task.

Where terminal cleaning is contemplated, the official supervision should be such as to regulate the cleaning in such a manner as to prevent the varnish surface from needing any excessive rubbing through the use of cutting erosives to remove the natural accumulation of dirt, grease, smoke, etc.

Such material and method, we think, would prolong the appearance and wearing life of varnish and lengthen out the shopping period for paint and varnish.

I am also pleased to note that Mr. Wright touches so strongly on the matter of car sanitation. Knowledge is fast educating the world's people to be on the alert for the deadly germ and microbe. If the traveling public could be universally educated up to know, as the car painter knows, to just what extent the practice of certain grossly filthy habits has upon the interior atmosphere of a passenger car, we would feel assured that they would feel like helping out the always- striving-to-please railway companies of to-day—we think there would be less trouble and expense in keeping up the desired high standards of passenger car sanitation.

As a fellow member of the Railway Club of Pittsburgh, I desire to thank Mr. John D. Wright for coming over to our city with such an able paper on a matter which we hope will both benefit and interest all those interested in the service maintenance of railway passenger equipment.

Yours truly,
W. O. QUEST,
Master Painter, P. & L. E. R. R. Co.

President: Are there any others who would like to talk on the subject?

Mr. J. D. McIlwain: There are quite a number of Pennsylvania Lines West people here who ought to have something to tell us. I say that for this reason: I have noticed that the local trains of the Pennsylvania Lines West—it may not be so to such an extent in the last year or so as to that I do not know—but in previous years, the last three or four, they make the best cleanly appearance of any lines entering Pittsburgh, particularly the Fort Wayne road. I think it would be interesting to railroad men here particularly to hear how they do that work and keep the cars in such good shape.

President: We would be very glad indeed to hear from any of the gentlemen.

Mr. J. McC. Barwis, of the Union Station Terminal Department: I am not a member of the Club, but by an invitation I came to this meeting to hear the question of "Car Cleaning" discussed. As my friend here has touched the Lines West, I will reply. I am not exactly a Lines West man, but I have charge of the cleaning at Pittsburgh.

Exterior cleaning is done on their equipment at regular periods with a modoc liquid, and we think it preserves the varnish and keeps the cars in very good condition.

In regard to the inside cleaning, we use warm water, soap and a mop, cleaning them regularly every day. We use a very weak solution of muriatic acid for the cleaning of closets, also, for a disinfectant. By doing this, we get along fairly well.

Mr. Wright very ably touched on the interior finish and construction of the car. This, I think, demands attention.

The roughness of the floors, in particular, after the cars have been in shop, is a matter of very grave importance. After the seats have been changed, the painters are not very careful in finishing the floors, that is, do not remove the marks where the seats have formerly been fastened. This leaves a rough place, so that when the cleaners clean the cars, the dirt that the mop should take up, and would, if the floor were properly smoothed, will not come off, presenting a very bad appearance. It is the same way with the parts around the steam pipes. Sometimes the steam is turned on before the paint is dry, causing it to blister and making it almost impossible to get the dirt out of these places.

As to the corners of the cars, there should be no square corners left in the floor. The floor should be equipped with some round moulding, having no sharp corners in which the dirt can accumulate. It is very difficult to get dirt out of sharp corners.

I notice Mr. Wright's paper touches on the length of time the cars are allowed to stand on the cleaning tracks. Very often, we find that the time is consumed in delivering cars to the cleaning yard, from some unknown cause, allowing cars to remain in the cleaning yard but a very short while, not coming to the cleaning yard until about time for them to be delivered to the depot. Then, of course, the cleaners have to be content to give them a "lick and a promise." Such conditions are very often kept up under circumstances over which the shifting department has no control, allowing cars to get in very bad condition. We have quite a large number of cars to handle at Union Depot and a very hard yard in which to handle them. The Lines West people, the P. F. C. in particular, have been more fortunate than the P. R. R. or the P. C. C. & St. L., because they have regularly assigned equipment to certain trains and they maintain the trains in that condition. Their cars are kept altogether, and are not subject to call for local service or extra movement. This has a great deal to do with the appearance of their cars. The cars of the P. R. R. are subject to call at any minute. They very often come into the depot from a short run and are turned right over into through service. This interferes with the proper care of the equipment.

Referring to car seats, the Transportation people should have the right to demand of the public, that they do not place their feet on the cushions. You frequently notice people having their feet on the cushions and other passengers enter the car.; it becomes necessary to throw the seats over and the passengers that have entered are obliged to sit down on soiled seats. Although plush makes a very nice and comfortable seat, it is not the best from a sanitary standpoint of view.

President: Mr. Wright will close the discussion.

Mr. J. D. Wright: In answer to Mr. Stark as to the washing of cars after they have been newly varnished and turned out of the shops, in my opinion it is a good plan to wash the exterior for two or three weeks in the summer time in order to harden the varnish. Of course this practice cannot be followed in cold weather, when water freezes.

Mr. Stark also asked how long a car ought to remain in service before being cleaned with a car cleaner. I would answer the question by saying that it ought to be cleaned with a car cleaner when the accumulation of soot and dirt which has not been removed by the wipings and cleanings begins to show on the surface. I cannot put it clearly in any other way. Some cars only make one hundred miles in a week while others make three thousand. And some cars run through mountainous country and will accumulate more soot in 100 miles than others which run through open country will in running 1,000 miles. As stated in the paper, the rules must be made elastic. And for this reason I tried to make it clear that it was necessary to have intelligent supervision.

The flooding of floors is of course bad practice, as it tends to rot out the sills and under-framing. There may be times when the dirt cannot be removed from the floors of express and baggage cars without the use of plenty of water. But ordinarily, sweeping and mopping with as little water as possible should be sufficient.

As regards the public treatment of cars in service, this is a delicate matter to handle. Some passengers seem to think when they buy a ticket that they buy the privilege of abusing the cars as much as possible, and they endeavor to get their money's worth by spitting on the floors and abusing the equipment. The conductors, brakemen and other trainmen employed by the transportation department can help greatly in this respect by encouraging passengers to be as cleanly as possible. There are laws to prevent the spitting on floors in the eastern cities, but they are not always enforced. The disinfectants on the market are usually perfumes, they are smell killers, not germ killers, and a disinfectant to be effective should be a germ killer. I am glad Dr. Milligan had something to say on this line because I believe he is more fitted to talk on this phase of the subject than I am.

The gentleman from the Pennsylvania Railroad touched on the assignment of cars. The assignment of cars to regular trains is a wonderful help to those taking care of equipment. When you know how frequently you are going to get a car, and how many miles it has to run, it is possible to put the cleaning up to someone to get it done, but when cars are running all over the line regardless of assignment it comes down to a case of being everybody's business, and everybody's business is usually nobody's business.

Mr. A. M. Keppel, Jr.: The paper submitted and discussed this evening is of very great importance. Mr. Wright has considered three subjects: 1st: The character of yards in which cars are to be cleaned. 2d: The movement of the equipment to and from the yards. 3d: The cleaning of passenger equipment cars.

On the first subject, I would like to say, that after considerable study, it has been thought best that cleaning yards should have tracks of 1,000 to 1,100 feet clear standing room arranged in pairs alternately, 15 and 22 feet centers, which would allow of five and twelve feet between the bodies of cars. Suitable platforms should be arranged. A certain number of the wider platforms should be provided with sheds for the purpose of protecting from the weather seats, curtains, bedding, carpets, etc., removed for cleaning from the parlor and sleeping car equipment. Mention has been made that arrangements should be made for steam, water and air pressure. I should like to add to this that there should also be provision made for the charging of storage batteries. In fact, the question of cleaning yard design is a very important and large subject, and should be treated in a separate paper.

The second question is between the Motive Power and Transportation department, as to the moving of equipment to and from the cleaning yards. The Motive Power Department, upon whom rests the responsibility for proper attention given the passenger equipment, believe that they are at the mercy of the Transportation Department, while the Transportation Department are made very uncomfortable by the Motive Power Department. Transportation officers favor one class of coach equipment for surburban service, and another for through service. Unfortunately there are a number of classes of equipment, and they are usually arranged to suit the passenger requirements which Messrs. Barwis and Wright consider as assigned equipment. As a mater of fact, it is not assigned equipment that those gentlement would prefer, so much as a sufficient time to properly care for this equipment. These certain cases where equipment usually used for certain service must necessarily lay a longer time than it would if the equipment was of the same class, as is regularly run in suburban service. There are two methods of caring for the equipment lighted by electric light where this is furnished from storage cells underneath the car. One is to remove exhausted cells, and to replace with fully charged cells. This method requires about one hour, while another is to charge the exhausted cells from a centrally located charging station without removing them. This method requires from six to twelve hours. From this latter method it can readily be seen the amount of service under this system, which can be gotten out of cars, would be very small. Further, where this method is used, the cleaning of equipment cannot be carried on at the same time as charging of the cells by reason of raising the voltage to such an extent that the carbon filaments in the lamps would be burned out. It requires from two to eight hours to properly care for parlor and sleeping car equipment. I should like to ask Mr. Wright how long he would consider it would require to perform the work under the two conditions he has mentioned of exterior and interior cleaning.

Mr. Wright: The first mentioned cleaning can be done in an hour, but the second requires at least three hours, in order to get the floors dried out properly after they have been mopped. And that does not include any special cleanings, such as washing ceilings and interior wood work or scrubbing the outside body with car cleaner.

Mr. A. M. Keppel: There is still an additional class of cleaning in the shape of modoc or exterior cleaning that requires more time.

Mr. Wright: That depends largely upon the force employed. If the yard is small and only a few men available for the special work, it takes much longer, of course, than if the yard has a large force available for the work. It is difficult to lay down rigid rules that will govern all conditions and fit all yards.

Mr. G. E. Carson: The paper tonight has been very well discussed, but I believe we set aside these papers too lightly. This subject interests me very much, and I am sure this Club has enough of good material in it to prepare a formula for the inside and outside cleaning of passenger cars, and should anyone be in a position to use it, very well, if not, it would be very good information to have at hand when wanted.

Mr. F. T. Hyndman: I believe it would be a good plan for the Club to have a committee to work on such cases as this and report as to what is the best method for cleaning equipment of this character. I therefore move the President appoint a committee of five to make a report on this subject.

The motion being duly seconded, was put to a vote and carried.

Mr. J. D. McIlwain: If there is no further discussion, I think the paper has been a very able one, and I move a vote of thanks to Mr. Wright for presenting this paper to the Club tonight.

The motion being put to a vote prevailed.

Adjourned.

EDWARD KERR, President. W. R. BROWN, Supt. G. W. GOSSER, Sec'y and Treas.

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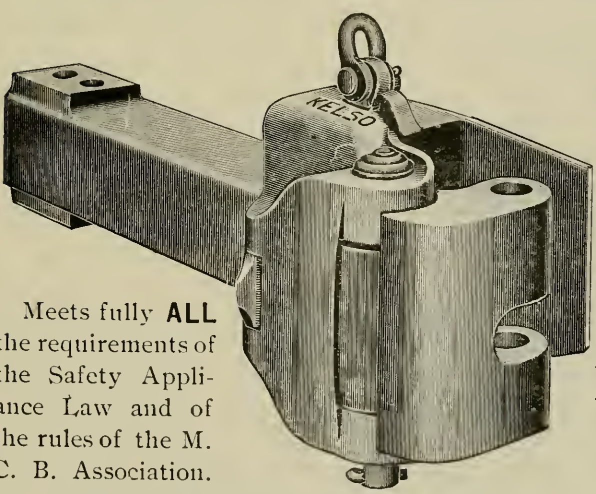

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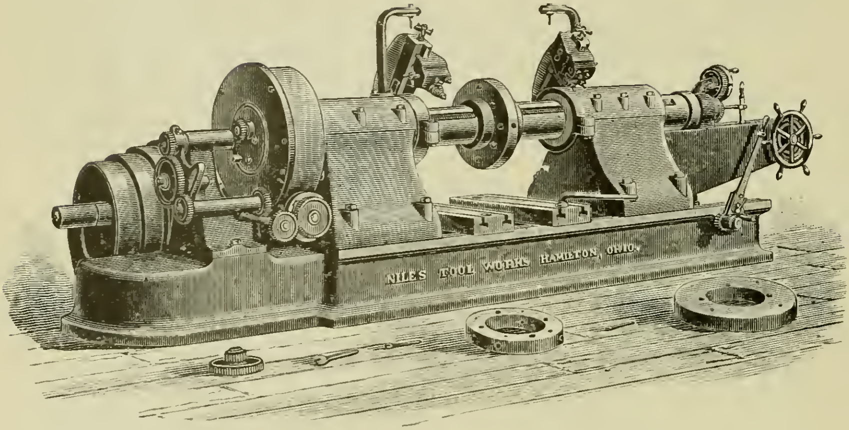
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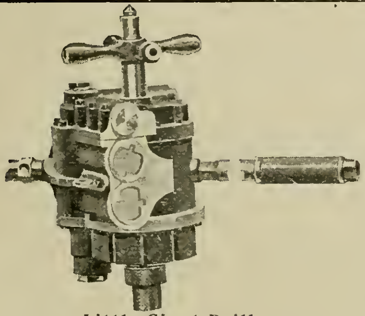

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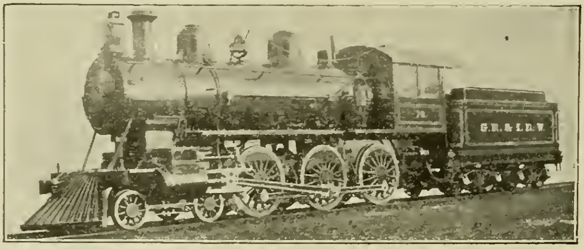

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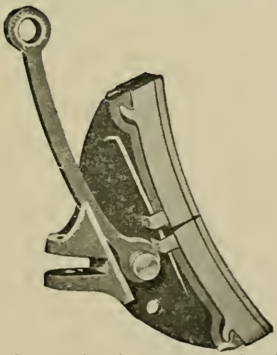

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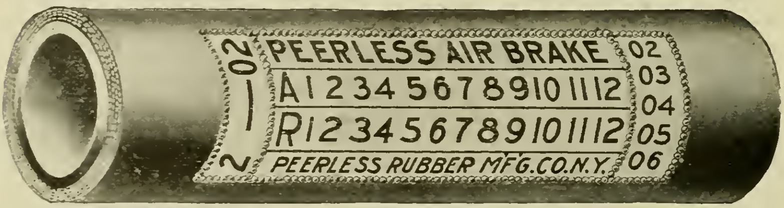
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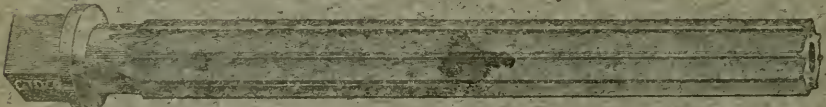

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A graphite compound that never "sets."

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Malleable Iron Castings for Railroad Use.

THE NATIONAL MALLEABLE CASTINGS COMPANY,

CLEVELAND CHICAGO. INDIANAPOLIS TOLEDO. SHARON.

Classified Index of Advertisements

Air Brakes—
Westinghouse Air Brake Co... ix

Air Compressors—
Chicago Pneumatic Tool Co... xiii
Manning, Maxwell & Moore... xv

Babbit Metal—
Damascus Bronze Co., Inside front cover
Lawrenceville Bronze Co ,.............. xi
Magnus Metal Co.,.................... ... vi

Belting—
J. D. McIlwain & Co ,............. x
Hukill-Hunter Co.,............ xvi

Boiler Washers and Testers—
Nathan Manufacturing Co.,............ iv

Boiler Lagging—
Franklin Manufacturing Co............ xv

Boiler Tubes—
National Tube Co.,....................... v

Bolsters—
Pressed Steel Car Co.,............... ....
Outside back cover

Brass and Bronze Castings—
Damascus Bronze Co.,.......................
Inside front cover
Lawrenceville Bronze Co.,...... xi
Magnus Metal Co.,.............................. vi

Brake Shoes—
American Brake Shoe & Foundry Co. ii
Hukill-Hunter Co.,..... xvi

Car Couplers—
Gould Coupler Co.,................................ ii
McConway & Torley Co.,.................. xi
National Malleable Castings Co.,...... vi

Car Heating and Lighting—
Gold Car Heating Co.,....................... vi
Safety Car Heating and Lighting Co. xiii

Castings—Malleable Iron—
National Malleable Castings Co.,..... vi

Coal and Coke—
Washington Coal and Coke Co.,...... xii

Conveying Machinery—
J. D. McIlwain & Co.,......................... x
Manning, Maxwell & Moore.... xv

Corner Bands—
Pressed Steel Car Co.,........................
Outside back cover

Drills—Twist—
Cleveland Twist Drill Co.,...............
Inside front cover

Friction Draft Gear—
Westinghouse Air Brake Co.,........... ix

Graphite—
Jos. Dixon Crucible Co vi

Hoisting Engines—
J. D. McIlwain & Co.,......... ....: x

Hose Clamps—
J. D. McIlwain & Co.,........... x

Injectors—
Nathan Manufacturing Co.,... .. iv

Jacks—
J. D. McIlwain & Co.,...... x
Hukill-Hunter Co xvi

Journal Bearings—
Damascus Bronze Co.,.....................
Inside front cover
Lawrenceville Bronze Co.,....... xi
Magnus Metal Co.,......................... vi

Locomotives—
American Locomotive Co...... xiv

Lubricators—
J. D. McIlwain & Co.,......... x
Nathan Manufacturing Co.,... iv

Machine Tools—
Niles Tool Works,...................... xii
Manning, Maxwell & Moore..... xv

Magazines—
Railway Age............................ iii

Malleable Iron—
Fort Pitt Malleable and Grey Iron Co...xvii

Oils—
Galena Signal Oil Co........ xvii

Oil Cups—
Nathan Manufacturing Co.,............ iv

Packing—
J. D. McIlwain & Co.,....................... x
Franklin Manufacturing Co.,........... xv

Paints—
Sherwin—Williams Co.,................... ii
The Lowe Brothers Co.,......... xvi
M. B. Suydam Co. i
Chas. R. Long, Jr........... iii

Paint Machines—
J. D. McIlwain & Co.,......................... x

Pipe and Pipe Fittings—
National Tube Co.,............................ v

Pipe Joint Paste and Compound—
Jos. Dixon Crucible Co..................... vi

Pneumatic Tools—
Chicago Pneumatic Tool Co,........... xiii
Manning, Maxwell & Moore............ xv

Pulleys—
J. D. McIlwain & Co.,......... x
Hukill-Hunter Co.,.......... xvi

Reamers—
Cleveland Twist Drill Co.,................
Inside front cover

Rubber Goods—
Peerless Rubber Mfg. Co.,......... xvi
Hukill Hunter Co.,....................... xvi

Safe Ends for Boiler Tubes—
National Tube Co.,............................ v

Index—Continued.

Side Stakes—
Pressed Steel Car Co.... Outside back cover

Spring Buffer Blocks—
Gould Coupler Co.... ii

Stay Bolt Iron—
B. M. Jones & Co.... xiv
Sligo Iron & Steel Co.... xviii

Stake Pockets—
Pressed Steel Car Co.,.... Outside back cover

Stay-Bolt Taps—
Cleveland Twist Drill Co.,.... Inside front cover

Steam Fire Extinguishers for Locomotives—
Nathan Manufacturing Co.,.... iv

Steel Tires—
Latrobe Steel Co.,.... iv

Steel Tired Wheels—
Railway Steel Spring Co.... xiii

Springs—
Railway Steel Spring Co.... xiii

Steel Cars—
Pressed Steel Car Co.,.... Outside back cover

Steel—Mushet's—
B. M. Jones & Co.... xiv

Tools—
Cleveland Twist Drill Co.,.... Inside front cover

Trucks and Truck Frames—
Pressed Steel Car Co.,.... Outside back cover

Valves—
Homestead Valve Mfg. Co.... iv

Varnishes—
Sherwin-Williams Co.,.... ii

Weldless Steel Flanges—
Latrobe Steel Co.,.... iv

Wheels—
National Car Wheel Co.,.... Inside front cover

Wooden Cars—
Pressed Steel Car Co.... Outside back cover

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The Westinghouse Friction Draft Gear is a gradually applied and automatically released frictional resistance which absorbs the shocks delivered to train during buffing and pulling operations. . . . .

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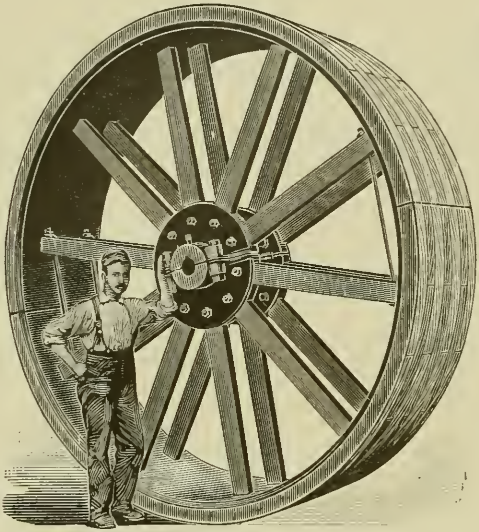

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7. Every pulley carefully balanced. Cannot get out of round.
8. Mechanical in construction and appearance
9. Made in all sizes and GUARANTEED FOR ANY POWER.

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We also furnish flange, dynamo and loose pulleys, step and taper cones and all kinds of pulleys of special construction, and will be pleased to quote prices on application.

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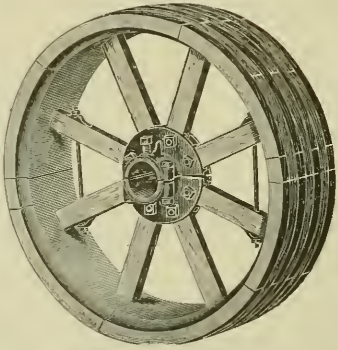

OFFICIAL PROCEEDINGS

of the

Railway Club *of* Pittsburgh.

ORGANIZED OCTOBER 18, 1901.

OFFICERS, 1903 - 1904.

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Supt. Motive Power, P. & L. E. R. R., Pittsburgh, Pa.

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Superintendent Transportation, P. & L. E. R. R., General Offices,
Pittsburgh, Pa.

F. H. STARK,
Superintendent Rolling Stock, Pittsburgh Coal Company, Coraopolis, Pa.

VOL. III.
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Pittsburgh, Pa., April 22, 1904.

$1.00 Per Year
20c. per Copy.

Published monthly, except June, July and August, by the Railway Club of Pittsburgh,
J. D. Conway, Secretary, General Offices P. & L. E. R. R., Pittsburgh, Pa.

Meetings held fourth Friday each month, except June, July and August.

PROCEEDINGS OF MEETING,

APRIL 22d, 1904.

The meeting was called to order at 8 o'clock, P. M. at the Hotel Henry, Pittsburgh, Pa., with President L. H. Turner in the chair.

The following gentlemen registered:

MEMBERS.

Anderson, H. T.
Barney, H. E.
Barnsley, Geo. T.
Bartley, Milton.
Berkebile, R. L.
Blackall, Robt. H.
Blest, M. C.
Brittain, Jno. B.
Buchanan, W. J.
Chittenden, A. D.
Conway, J. D.
Courtney, D. C.
Cox, Geo. W.
Cox, H. A.
Dambach, C. O.
Decker, O. S.
Diamond, P. R.
Dow, Geo. N.
Ford, D. W.
Forsberg, R. P.
Francis, Jno. S.
Gies, Geo. E.
Gillen, John.
Grove, E. M.
Halleran, H. J.
Herrmann, J. C.
Hindman, S. M.
Hirsch, Wm. L.
Hoffman, N. K.
Hooff, J. L.
Hunter, H. S.
Huyett, E. G.
Hyndman, F. T.
Jennings, F. R.
Jeny, Jacob.
Johnson, C. S.
Keppel, A. M., Jr.
Lindstrom, Chas. A.
Lininger, E. W.
Lininger, W.
Lobez, P. L.
Long, R. M.
Lynn, Sam'l.
Macoubray, R. J.
Mechling, J. E.
Miller, Orlando.
Milliken, I. H.
McFeatters, F. R.
McIlwain, J. D.
McKenna, E. P.
McNulty, F. M.
Oates, Geo. M.
Peach, W. M.
Quest, W. O.
Redding, D. J.
Rhodes, G. P.
Rhodes, Jas. D.
Richardson, W. P.
Riley, J. W.
Shannon, Chas.
Shupe, C. W.
Sipe, Geo. T.
Slocum, A. W.
Smith, D. W.
Sproat, H. H.
Stark, F. H.
Summers, E. W.
Sweeley, G. P.
Thomas, I. B.
Tracy, M. S.
Turner, L. H.
Van Tine, H. C.
Ward, John.
Warne, J. C.

Kessler, D. D.
Kincaid, B. M.
Kleine, R. L.
Knight, E. A.
Lee, L. A.
Warnock, H. R.
Watts, H. W.
Weigel, F. S.
Wilkinson, J. A.
Winlo, R. C.
Wright, R. V.

VISITORS.

Alleman, C. W.
Barrow, Jno.
Beck, Jno. A.
Brown, A. D.
Connelly, A. A.
Core, D. H.
Eagle, S. S.
Eichenberger, J. J.
Fertig, F. J.
Graser, T. N.
Gies, A. A. W.
Gross, Chas. H.
Gulick, H., Jr.
Hamerschlag, Prof. A. A.
Keagy, Chas. O.
Kenedy, Jas.
Kennelly, T. J.
Kinter, D. H.
Kissinger, C. F.
Korba, W. J.
Miller, J. E.
Meyhre, P. E.
McKee, F. E.
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Roberts, Jno. R.
Schultz, G. H.
Schmorr, G. A.
Smith, Sion B.
Smith, R. J.
Streib, J. F.
Suckfield, G. A.
Wood, W. H.
Wollaston, Chas. F.

President: The minutes of the last meeting being in the hands of the printer, the reading of them is dispensed with.

Secretary J. D. Conway read the following proposals for membership:

H. H. Anderson, Supt., Schoen Steel Wheel Co., Pittsburgh, Pa.

W. M. Johnson, Vice Pres., Schoen Steel Wheel Co., Pittsburgh, Pa.

F. B. Foster, Secy., Schoen Steel Wheel Co., Pittsburgh, Pa.

D. E. Cassidy, Master Mechanic, West Penn Div., P. R. R., Allegheny, Pa.

J. McAndrew, Genl. Yard Master, Penna. Lines West. Conway, Pa.

T. E. Townsend, Engine House Foreman, Penna. Lines West, Conway, Pa.

W. W. Winneal, Genl. Car Foreman, Penna. Lines West, Conway, Pa.

F. J. Lauer, Asst. Genl. Foreman, Penna. Lines West, Conway, Pa.

H. G. Horner, Chief Clerk to Genl. Foreman, Penna. Lines West, Conway, Pa.

Jas. G. Hempsted, Supt., Oliver Iron & Steel Co., Crafton, Pa.

Chas. G. Tate, Secy. and Mgr., Flannery Bolt Co., 339 Fifth Ave., Pittsburgh, Pa.

Geo. L. Ball, of Ball Chemical Co., 907 West Diamond St., Allegheny, Pa.

Jas. A. Bradley, Rep. Ingersoll Sergeant Drill Co., Park Bldg., Pittsburgh, Pa.

J. McC. Barwis, Foreman Inspr., P. R. R., Union Station, Pittsburgh, Pa.

J. K. Booth, Genl. Foreman, B. & L. E. R. R., Greenville, Pa.

Jno. Barron, Genl. Sales Agent, U. S. Bronze Co., Pittsburgh, Pa.

Wm. B. Chislett, Pass. Condr., P. R. R., Union Station, Pittsburgh, Pa.

The Report of the Committee appointed by the Chair on Revision of the M. C. B. Rules, through Mr. F. H. Stark, its Chairman, presented the following report:

COMMITTEE REPORT, SUGGESTING CHANGES IN THE M. C. B. RULES.

Your Committee on revision of M. C. B. rules have but few changes to suggest. On the whole we consider the present rules as quite satisfactory, however, in view of the ever changing conditions, we find that some modifications and additions are essential to keep pace with progress.

Rule 3:

Add to this rule the following: To designate location of parts the letters A or B end, *right or left side.*

It is very desirable to have M. C. B. repair and defect cards show the exact part and location referred to, and we would submit to the Arbitration Committee the matter of formulating suitable instructions.

Rule 14:

Add the word cracked: Making the rule to read: "Broken *or cracked* flange, caused by seams, worn through chill or worn flange. See also rule 20 and 21."

This change is suggested to cover defects in wheels, more frequently found under heavy capacity cars, commonly known as heat cracks, which are not inherent in the wheels, such as cold shuts, but originates on account of greater friction between flange and rail, on account of increased load carried, augmented by the heating of wheels, by the application of brakes.

Rule 18:

Substitute the word *or* in place of the word and, after the word length, so as to make the rule read: Chipped flange; if chip is on the outside of flange and exceeds 1½ inches in length *or* ½ inch in width, or if it extends ⅛ inch past the center of flange.

Figure 1.

M. C. B. Wheel defect gauge.

Change the radius from $\frac{3}{16}$ inches to ¼ inch, at the corner of the opening $1\text{-}\frac{1}{16}$ inches.

Wheels under cars of 80,000 capacity or over with throat of flange cut away, and yet pass under present practice with gauge having $\frac{3}{16}$ inches radius renders the liability of flange failure too great. While with cars less than 80,000 capacity with flanges more than 1 inch thick, as determined by the present M. C. B. Wheel gauge is safe and good practice.

Rule 20:

Substitute the word *or* in place of the word and, after the word length, so as to conform to the change suggested in rule 18.

Rule 22:

Add the words tapering or worn hollow, making the rule read as follows; Axles broken, or having seamy, *Tapering, or Worn Hollow Journals*, fillets at the back shoulder worn out, or with collars broken or worn to ¼ inch or less, under fair usage.

Rule 29:

Change to read as follows: "Defective, missing or worn out parts of brakes, *also torn Air Hose*, not elsewhere provided for, which have failed under fair usage, except missing material on cars offered in interchange.

Rule 34:

Add the word steam pipes, making the rule to read as follows: If the car has *Steam Pipes*, Air Signal Pipes or Air Brake Pipes, but no Air Brakes, *the Pipe and Fittings*, including the Air or Steam Hose and couplings on the car are at owners risk, unless the car is stencilled that it is so equipped.

Rule 35:

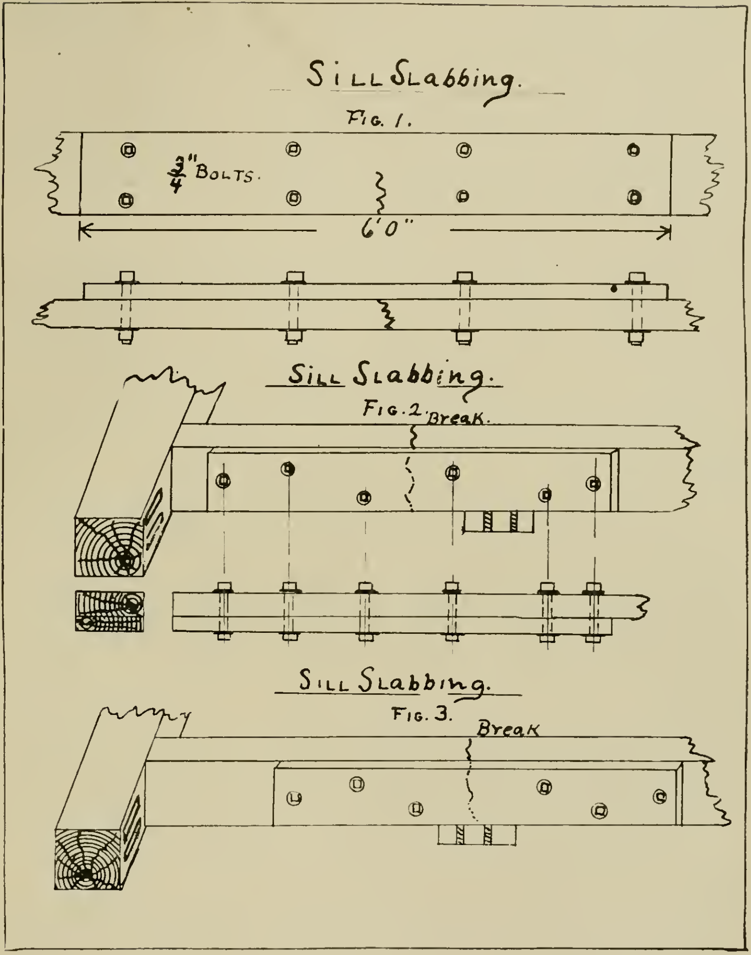
Add after the third word, *End Doors, Roof Doors.*

Rule 41:

Add to rule 41 the following: *Metal Brake Beams of proper dimensions, and which do not necessitate the change of hangers or connections will be considered proper repairs.*

Rule 63—A:

Cars of Sixty Thousand Capacity (60,000) or less with intermediate or Side Sills Damaged, (but with no part thereof missing), may be Slabbed between End Sills and Cross Tie Timber, providing that not to exceed one half of the number of said Sills are Slabbed, or Spliced at the same end of Car. Slabbing (Reinforcing) Timber must be Three (3) inches or over in thickness of New Oak, or Four (4) inches or over in thickness of Good Sound Pine, to be full depth of Sill and not less than Six (6) foot long secured to Longitudinal Sill with ¾ inch Bolts, preferably as shown in Cut No. 1, but where the construction of the Car will not permit of such location and spacing of Bolts, Plans as shown in Cuts Numbers Two (2) and Three (3) be followed.



Rule 63—B:

Foreign Cars with Longitudinal Sills Damaged making Delivering Roads responsible under Rules 51, 52 and 53, shall be Renewed or Spliced as per Rule 63.

Rule 63 A may be considered as a radical innovation, but not so. This practice has been in vogue on some Roads with satisfactory results.

Cars of 60,000 capacity and under are fast going out of service, the point is to perpetuate them in service until the physical condition of the cars as a whole will warrant in its abandonment.

These economy measures will prove a saving in labor, material and delay to Cars, and if favorably acted upon, a labor charge for Slabbing Sills should be added to the schedule of prices in Rule 104.

Rule 74:

Change this Rule, so as to indicate the location of parts to conform to suggested change in Rule 3.

Rule 85:

Add after the word Couplers in first sentence, *Second Hand Doors*, otherwise Rule to remain as it is.

Rule 87:

Add to the schedule a price for *Seventy Thousand* (70,000) *Capacity Axles.*

Also another paragraph as follows: *When Wheels over Six Years Old are removed on account of Defective Axle or Wheel Mate, Wheel should be credited as scrap.*

Rule 88:

Add after the term 80,000, *Sixty Thousand* (60,000) *Pounds*, so as to make the last paragraph read: Axles removed below the Journal limit of 100,000 Pounds, 80,000 Pounds. *Sixty Thousand* (60,000) *Pound* and 40,000 capacity to be credited as scrap when removed.

Rule 91:

Change the second sentence to read: Terms used in Rules 7 to 24 inclusive.

Rule 92:

A price to be added covering *Stock Car Roof Doors, and Refrigerator Roof Doors.*

COUPLERS. A seperate price for Malleable Couplers with 5x5 shank, or with 5x7 shank. Also Steel Couplers 5x5 shank or 5x7 shank.

Add a note after Rule 92 as follows: Where no credits are shown the price charged shall be considered as net.

Rule 98:

Change thickness of lining viz.: $\frac{1}{4}$ inches to *Five Sixteenths $\frac{5}{16}$ inches.*

Rule 100:

Add after the word New in the fifth line the following: *Metal Brake Beams of the same make are applied on account of defective parts, charge shall be made for the defective parts only, renewed.*

Rule 102—A.

Add Section to Rule 102 to read as follows:

When Wrong Trucks are applied under a Foreign Car the Home Road or Company making the change to the Original Construction of Car may make a charge of Two (2) Dollars per Truck for Unloading the Original Trucks and Loading the Wrong Trucks.

Original Trucks returned shall be delivered free of freight or other charges, as per Rule 120. Wrong Trucks removed shall be returned at the expense of Company making the improper repairs.

Rule 104:

We would recommend that the Arbitration Committee consider in detail the prices as prescribed by the M. C. B. rules, calling particular attention to a few items.

Couplers with Special Attachments, Four Hours.

The Arbitration Committee to give an opinion as to what constitutes special attachment.

Draft Timbers extending through and beyond Body Bolsters.

Draft Timber Bolts, *or Carrier Iron Bolts*, three or less at same end of car, replacing, two hours.

Draft Timber Bolts, *or Carrier Iron Bolts*, four or more at one end of car, replacing, three hours.

Draft Timber Bolts, *or Carrier Iron Bolts*, complete at one end of car, replacing, four hours.

Price for renewing car siding per lineal foot.

One price should be made for one or two lineal feet, and a lesser price per foot for over two lineal feet, or a compromise price for an average.

LUMBER. Including the Mill labor 2½ cents per foot board measure. We believe that this price should be increased.

Rule 110:

Change this rule to read Triple Valve, removed, cleaned, oiled, tested on *Shop Rack*, and stencilled, 24 cents.

Rule 111:

A separate price should be shown for all steel cars of various types. Also cars with steel underframes.

Rule 112:

We would submit to the Arbitration Committee for consideration the question, as to whether the value of metal cars should be depreciated at the same rate per annum as composite cars.

Rule 118:

Change the heading of this rule as follows: "Destroyed cars, and the return of trucks, *Metal Body Bolsters*, *Metal Underframes*."

Rule 120:

Add after the word trucks in third line, *Metal Body Bolsters or Metal Underframes.* The balance of the rule to remain as it now stands,

If this suggestion should meet approval, it would be necessary for an average price to be made on metal body bolsters, and metal underframes, and prescribe in the rules the same as we fix the price for air brake equipment returned.

In way of explanation for not treating on the important question of Steel Car Values and Repairs, your committee feels that the Arbitration Committee will be in possession of information from a larger number of Roads, and in better position to consider the matter more intelligently. Then to the fact that other Car Builders have, or are preparing to build all metal cars, the natural consequences will be a more aggresive competition. This coupled with the growing sentiment that values will gradually settle down to a somewhat lower basis, all of which no doubt will tend to establish precedents in the market price of all metal cars. In view of these facts the Arbitration Committee may prefer to defer the matter of values for all metal cars for another year, and in the meantime possibly treat all metal cars as of special design.

In regard to Steel Car Repairs. The Committee found that the time was too limited to undertake the work this year. Then to out of deference to the Master Car Builder's Committee who have the subject of steel car repairs under consideration, we feel that it would not be wise to make any recommendations at this time.

The Special Committee appointed by the Master Builders' Convention to make their report at the June Convention will no doubt lay down some fundamental principles as a basis to work on, after which we believe the Committee representing the Railway Club of Pittsburgh through the members of this Club will be in position to furnish reliable information on this subject.

Respectfully submitted,

J. B. Swann, Penna. Lines,
W. J. Buchanan, B. & L. E. R. R.
S. A. Cromwell, B. & O. R R.
A. LaMar, Penna. Lines,
H. W. Watts, M. C. R. R. Co.,
J. P. Yergy, P. R. R Co.,
Geo. N. Dow, L. S. & M. S. Ry. Co.,
G. E. Carson, P. & L. E. R. R. Co.,
F. T. Hyndman, B. R. & P. Ry. Co.,
R. L. Kleine, P. R. R. Co.,
Committee.

F. H. Stark, Pgh. Coal Co.,
Chairman.

President: Unless there are objections, we will consider and act on this report seriatim. And I will ask the Secretary to read the Rule as it now stands, in each instance, and then Mr. Stark will present the modification recommended by the Committee.

The recommendations as presented by the Committee were, with but one or two slight changes, adopted.

Note: The report as herein printed shows the report as corrected.

Mr. J. D. McIlwain: Our standing Committee on the M. C. B. Rules of Interchange have shown themselves to be made of the right stuff, and will no doubt make their mark. For their good work, I think they are entitled to our appreciation and encouragement. Therefore, I move them a vote of thanks on account.

The motion being duly put to vote was carried.

President: There is no doubt that the work of this Committee will reflect a great deal of credit on the Railway Club, of Pittsburgh.

President: In addition to the report to-night, Mr. Hamerschlag, Director of the Carnegie Technical School, has kindly consented to talk to us. As he has come here at great inconvenience to himself and expense of time, and with the consent of the Club we will postpone the further consideration of the report of the Committee until after we have heard from Mr. Hamerschlag. And I take great pleasure in introducing to this Club Mr. A. A. Hamerschlag.

Mr. Hamerschlag: I feel very much like a tyro in coming here to speak to railroad men on railroad topics. But Mr. Turner came to see me and asked me if I would not come here and become acquainted. Now I do not know that I can do very much in the way of getting acquainted if I am to get on the platform and talk to you. But, nevertheless, the subject of railroading is such an important one, when you consider its bearings upon a people and its relations to technical training, that I thought it well to come here to-night and talk to you as a representative body, and ask you to give me your views and your ideas as to how a course dealing with traction, dealing with railroading, could be embodied in our institution to make it a well-rounded technical school.

It is needless for me to tell you that the railroads, with their ribbons of steel penetrating every little hamlet throughout the country, crossing the deserts of the west, and south into Mexico, and the north into Canada, all pay tribute to this iron and steel country. They have got to get their rails here. If you will couple with that the thought that Pittsburgh has the greatest railroad tonnage of any city in the United States, it means that this should be the home and the place for something in the way of an educational institution which will aid the railroad development of this country.

How far we are to do this work and how far the practical men who are railroad engineers are to do it, rests very largely with the community, very largely with organizations such as yours. But it seems to me that there is a broad opportunity awaiting the railroad men.

If we touch anything on that subject, let it be thorough. Let it cover not alone the mechanical, engineering, hydraulic and pneumatic phases; not alone car construction and rail laying and the deflection of ties and their wear; not alone the construction of locomotives and their operation as a machine; not alone the loading of our trains and the hauling of them, and the feeding of passengers and the handling of our immense freight, and your refrigerating methods—let them all be incidental, but let us try to picture to ourselves a broad technical training for railroad men that shall include something of all these. And when you speak of railroads, a great many things are included beyond and above the purely technical details which I have outlined. Stations must be constructed; there is to be considered architecture, building construction, sanitation, hygiene. After the stations must come the warehouses, the grain elevators. They are allied to the railroads. Then there are the mills, with the sidings running to the mills, the internal railroads of the mills, all feeding the big heart which we call the main railroad or trunk line. These things in themselves are purely technical details. Let us now consider the effect of railroad development upon the increase of population, upon commerce, upon industry, upon the development of a people and a city. Let us see which of these things not ordinarily taught in a technical school can well be included in the curriculum. Something concerning costs, something concerning handling and stations, of the increase to railroad values by the increase of territory which that railroad reaches. Something beyond the mere building of bridges and viaducts and trestles, something which means the opening up of new country and new people and new industries and commerce, delivering the raw materials from one center to another.

The time of the unit system of railroads is nearing its end. By that I mean to say that the time when the steam locomotive as a unit will be the propelling power, the power for hauling cars, is coming to an end; the time for carrying your raw fuel, converting it into available steam energy by heat, that is nearing an end. The establishment of a central power plant of a big system, properly constructed and with a proper transmission of energy to the units cannot be far off. The coming technical engineer, adapted for any place on the railroad, must become familiar with that phase of the subject. In addition to that he must have clearly defined those elemental principles of the development of civilization, the utilization of raw materials, the connection between the freight rate, which is charged for the transportation of those materials, both raw and finished, and the development of the community, the rate which the consignor can afford to pay and the price at which the manufacturer can afford to sell. Those are things which are allied immediately and closely to the development of true railroading.

I say these things in a purely theoretical spirit, without having had a great deal of practical railroad experience myself. I know that there are among you representatives from all the various railroads of this district, some from the engineer's office, some from the passenger department, some from the freight offices, some of you from the supply department, some of you are familiar with the intimate details of your organization, and I feel certain that with your co-operation the Carnegie Technical Schools can benefit tremendously, if it does anything for traction interests. To what class of men the term railroad man can be applied, whether it is suburban street car railway or whether it is a big steam trunk line, is something for you gentlemen to decide. I do not know where the dividing line comes, if there is any distinction. But I do know this—that all of them are very intimately related, and that the modern passenger system of a street railway suburban feeding mechanism is merely a miniature and model of what the trunk line will be at some future day. You can develop power for less money, more efficiently, in big units in a single place. Find an efficient manner of transmitting that power over long distances, more efficient than hundreds of separate fires burning under separate boilers in the cabs of engines, and you will come down to the one elemental question, and that is a determination of the kind of training necessary for the future railroad engineer. And if you can train the right kind of an engineer, he is going to have a fair amount of business training, he is going to have a fair amount of culture, he is going to have a fair knowledge of economics—having direct reference, perhaps to the railroad or to the community.

If you will consider those four or five thoughts, together with your own experience and the experience of your officers, I feel certain that if you make a recommendation to the Carnegie Technical Schools that they establish and develop a course for railroad men, we can do so intelligently and satisfactorily, not only to ourselves, but for the better development of our institution and your own city.

Mr. A. W. Slocum: It just so happens that I have been fortunate enough to come in contact with Mr. Hamerschlag in relation to a similar educational purpose to that for which he is here this evening, and have found that his entire intent and idea is that of obtaining the most good for the majority of the people. And I would suggest that so long as the Carnegie Institute, represented by Mr. Hamerschlag, is willing and desirous of including in their curriculum a department of railroading—and I would like to correct, or rather modify, Mr. Hamerschlag's idea of the representation here to-night, and that is, it is largely that of the practical departments of the railroad, such as construction, car building, locomotive building, engineering, maintenance of way, etc. This assembly is really one of practical maintenance of the system of railroads, without regard to passenger or freight service. And I think his idea in his remarks is that of bettering and instilling from the start, the ideas and principles which will help the young man in connection with the railroad, to be of value to himself, and to be of value to the road which he represents, in an intelligent manner.

And I would suggest that the Chairman appoint a Committee to formulate such ideas in a proper manner that can be handed to Mr. Hamerschlag, so that there can be instituted, as they are willing to do, a department in the institution which is going to be unquestionably the best educational institute of its kind that we have to-day, and thereby be represented and have a chance to have your young men that you care for, that you bring up, your apprentices, your own sons get a good and intelligent start. And I would make that as a motion, that the Chair appoint a Committee to handle this subject in conjunction with Mr. Hamerschlag.

The motion, being put to vote, was carried, and it was so ordered.

On motion of Mr. F. H. Stark, it is declared to be the sense of this Club that we extend to Mr. Hamerschlag our sincere thanks for his courteous remarks and the very complimentary offer that he has proffered us.

President: Mr. Hamerschlag states that if any of the gentlemen present would like to ask any questions in regard to the new schools or his work, he would be very glad to answer them.

Mr. Robt. H. Blackall: I would like to ask if it is contemplated to have a series of lectures that would take in such subjects as will interest railroad and engineering men in general. And is there any special method of application to obtain permission to attend the various lectures?

Mr. A. A. Hamerschlag: The ultimate aim of the institution is the establishing of just such departments as the one outlined for railroad men. We expect to have at least two sub-divisions, perhaps three. One in which your apprentices can attend at night and get some theoretical instruction concerning the things they have been practicing all day; second, a department for older men who are already ranked as railroad men and who know their particular branch very well, but who desire to advance themselves theoretically and technically, with a view to holding higher and better places. That of course will be purely a lecture-laboratory course, given in the evenings to anyone wishing to attend. These are the two sub-divisions of which we can speak definitely. There is still a third, however, of a great deal more importance when the future of the schools is considered, and that has reference to purely technical training for railroad men. A day course of two, three, four or five years' duration, whatever experts think necessary, dealing with the chemistry of metals in use, that is, dealing with the physical properties of those metals, dealing with the elements of mechanism, with pneumatics and hydraulics, with electricity and its application to railroading. And when I speak of chemistry I mean the chemistry of foods for workingmen, not the chemistry which the manufacturer of steel and iron finds it necessary to have a knowledge of; but I mean the specific attributes of chemistry which have relation to some of the things which a railroad man does and needs, some of the materials with which he works, comes in contact with and buys. For instance, one of the important things in a railroad I should think would be soap. The chemical properties of soap when familiar to the purchasing agent of a railroad, can be very much better compared as to price and value. And not only the purchasing agent, but any man, irrespective of his calling with reference to railroad work, might find it to his advantage to have a knowledge of the chemical properties of lubricants, and of the purely mechanical operation of a locomotive, without being a locomotive engineer; or of some method by which he could calculate the resistance, tractive energy, jar or wheel wear on railroads. He might have those principles without becoming an actual operator of those different kinds of apparatus. So he might have a knowledge of the form of construction of a steel car as compared with a wooden one, without being the manufacturer of either of those cars.

Each year and each month new developments in railroading are being published and manufactured and marketed, and if one has received a technical training there is no reason why he cannot be of aid to service officials in the railroad business in being able to determine for his railroad the merits of these new inventions and their comparative saving to that railroad. These are just a few of the things which this type of man should be trained for. It rests entirely with you whether the schools shall have a single sub-division simply and purely for your apprentices, something for your sons, something for other men's sons, who have neither the opportunity nor the financial resources to attend a school for a number of years in the day time. Or shall you in addition to that demand something for the men who wish to get some laboratory instruction in the form of lectures, men like yourselves, already in your vocations and already placed? And to go still further, shall you establish in this city in the best place where you can get an object lesson in railroading, a purely technical course? If you should call the course railroad engineering it would immediately convey to your mind the thing I have in mind.

That is merely a sketch of the three types of education, and I wish the technical school to possess inside of its doors, if it has only one, that of the apprentices, purely a simple elementary school; if it should have another, pitch it a little higher, for men already in vocations, and the school becomes a little stronger and broader. But when you seek something beyond that and enter into the scientific branch of those underlying subjects, you have the actual technical school, the school which embraces not alone that for the great number, for the struggling nine-tenths who are coming up, but something for the one-tenth, which is of superlatively better material and capable of receiving instruction.

Mr. H. W. Watts: I wish Mr. Hamerschlag would tell us just who will be eligible to the technical school when it will be fully under way, and especially the degree of previous education that will be demanded.

Mr. A. A. Hamerschlag: The school is free to everyone without regard to color or finances. The tuition fees will not be enough to pay for the light that will be used, much less the material and the instructor's services. Everyone will be admitted, and the entrance qualifications will be entirely based on the course of instruction. If it is for apprentices, a knowledge of simple English will admit the student over 16 years of age; if it is for a journeyman or one already engaged in the occupation, nothing beyond the fact that he is in the occupation and desires further instruction will be necessary. If he understands English we will admit him without examination as to whether he can read or write. If he wishes to enter the school of applied sciences, as we call it, then the entrance requirements will be pitched somewhere between the present grammar school education and the requirements for the university, so that the student must have had elementary training in English, arithmetic, reading, writing, a knowledge of the metric system of weights and measures in addition to the ordinary numerical units, in order that he can appreciate the kind of information that we want to give him.

Upon motion adjourned.

In pursuance of the resolution offered at the meeting of the Club, April 22d, the following letter was addressed to the gentlemen selected to compose the committee:

Pittsburgh, Pa., April 23, 1904.

Dear Sir:—Prof. A. A. Hamerschlag, director Carnegie Technical Schools of Pittsburgh, in his address before the Railway Club of Pittsburgh on Friday evening, April 22, requested suggestions and recommendations from the Club that would guide him in establishing a department or chair for the promulgation of instructions for practical railroad work, the object being to give men who already hold a position in one department an opportunity for further development by taking the lighter courses in technical training in matters pertaining to the different branches of the service, other than that in which they are engaged. The object is to enable men to acquire a general knowledge of the requirements of each department, and, while not specialists in any, might intelligently direct all. It is believed you will appreciate the possibilities in this direction and will be glad to assist by becoming one of a committee to confer with and present to Prof. Hamerschlag suggestions to guide him in part in the organization of what is expected to be one of the greatest institutions of learning in the world.

The following list of gentlemen have been selected to form the committee:

E. M. Herr, General Manager, Westinghouse Air Brake Company, chairman.

Geo. T. Barnsley, Resident Engineer, Wabash R. R. Co., Pittsburgh.

A. B. Bellows, Manager, Pittsburg Testing Laboratory.

D. F. Crawford, General Superintendent Motive Power, Pennsylvania Lines West.

J. M. Hansen, President, Standard Steel Car Company.

A. Kearney, Superintendent Motive Power, Baltimore & Ohio R. R. Co.

Col. J. M. Schoonmaker, Vice President and General Manager, Pittsburgh & Lake Erie R. R. Co.

W. H. Marshall, General Manager, L. S. & M. S. Ry. Co.

R. E. McCarty, Superintendent, Pennsylvania Lines West.

G. M. Basford, Editor, American Engineer & Railroad Journal.

H. B. Ayers, General Superintendent, American Locomotive Company, Pittsburgh.

May I ask you for an expression as to whether you are willing and will find it convenient to serve?

Thanking you,

I am very truly yours,

L. H. TURNER,
President.

In response to the above letter a favorable reply was received from the gentlemen named.

EDWARD KERR, President. W. R. BROWN, Supt. G. W. GOSSER, Sec'y and Treas.

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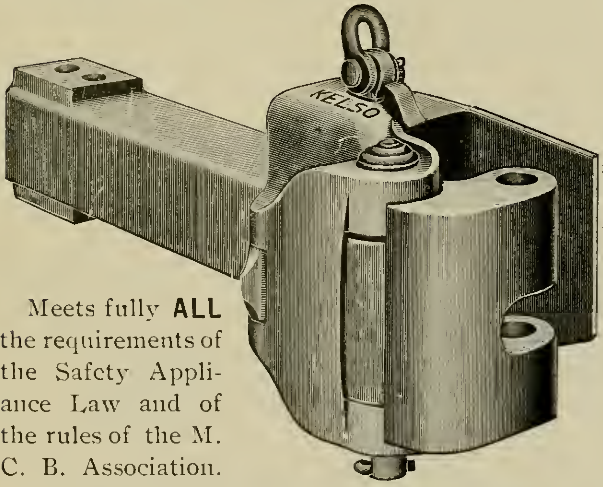

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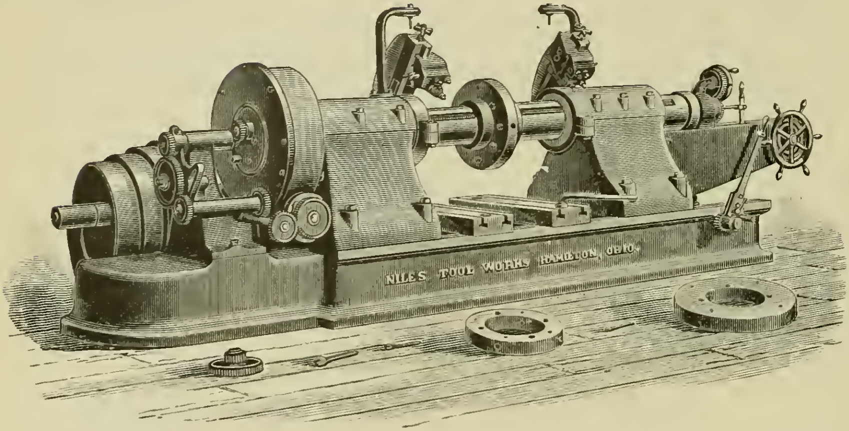
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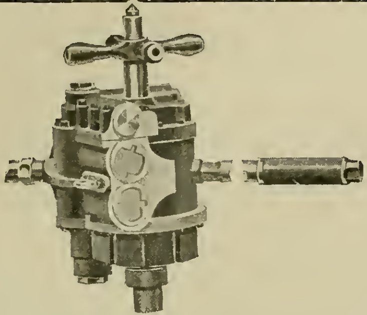

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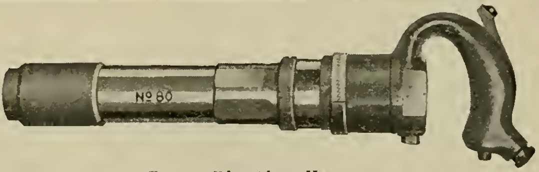

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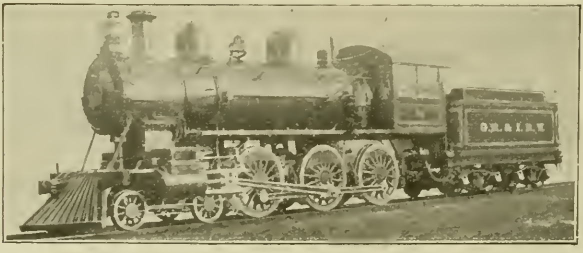

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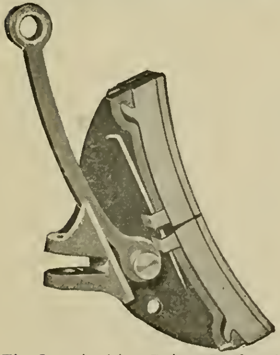

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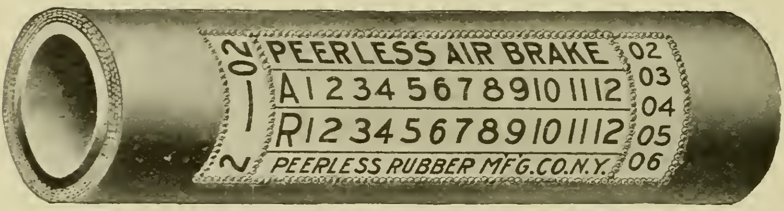
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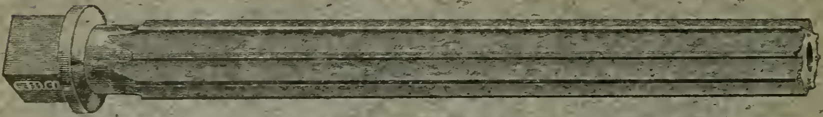

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Classified Index of Advertisements

Air Brakes—
Westinghouse Air Brake Co... ix

Air Compressors—
Chicago Pneumatic Tool Co.......... xiii
Manning, Maxwell & Moore............ xv

Babbit Metal—
Damascus Bronze Co., Inside front cover
Lawrenceville Bronze Co., xi
Magnus Metal Co., vi

Belting—
J. D. McIlwain & Co., x
Hukill-Hunter Co., xvi

Boiler Washers and Testers—
Nathan Manufacturing Co., iv

Boiler Lagging—
Franklin Manufacturing Co. xv

Boiler Tubes—
National Tube Co., v

Bolsters—
Pressed Steel Car Co., Outside back cover

Brass and Bronze Castings—
Damascus Bronze Co., Inside front cover
Lawrenceville Bronze Co., xi
Magnus Metal Co., vi

Brake Shoes—
American Brake Shoe & Foundry Co. ii
Hukill-Hunter Co., xvi

Car Couplers—
Gould Coupler Co., ii
McConway & Torley Co., xi
National Malleable Castings Co., vi

Car Heating and Lighting—
Gold Car Heating Co., vi
Safety Car Heating and Lighting Co. xiii

Castings—Malleable Iron—
National Malleable Castings Co., vi

Coal and Coke—
Washington Coal and Coke Co., xii

Conveying Machinery—
J. D. McIlwain & Co., x
Manning, Maxwell & Moore xv

Corner Bands—
Pressed Steel Car Co., Outside back cover

Drills—Twist—
Cleveland Twist Drill Co., Inside front cover

Friction Draft Gear—
Westinghouse Air Brake Co., ix

Graphite—
Jos. Dixon Crucible Co vi

Hoisting Engines—
J. D. McIlwain & Co., x

Hose Clamps—
J. D. McIlwain & Co., x

Injectors—
Nathan Manufacturing Co., iv

Jacks—
J. D. McIlwain & Co., x
Hukill-Hunter Co xvi

Journal Bearings—
Damascus Bronze Co., Inside front cover
Lawrenceville Bronze Co., xi
Magnus Metal Co., vi

Locomotives—
American Locomotive Co. xiv

Lubricators—
J. D. McIlwain & Co., x
Nathan Manufacturing Co., iv

Machine Tools—
Niles Tool Works, xii
Manning, Maxwell & Moore xv

Magazines—
Railway Age iii

Malleable Iron—
Fort Pitt Malleable and Grey Iron Co. xvii

Oils—
Galena Signal Oil Co. xvii

Oil Cups—
Nathan Manufacturing Co., iv

Packing—
J. D. McIlwain & Co., x
Franklin Manufacturing Co., xv

Paints—
Sherwin—Williams Co., ii
The Lowe Brothers Co., xvi
M. B. Suydam Co. i
Chas. R. Long, Jr. iii

Paint Machines—
J. D. McIlwain & Co., x

Pipe and Pipe Fittings—
National Tube Co., v

Pipe Joint Paste and Compound—
Jos. Dixon Crucible Co vi

Pneumatic Tools—
Chicago Pneumatic Tool Co, xiii
Manning, Maxwell & Moore xv

Pulleys—
J. D. McIlwain & Co., x
Hukill-Hunter Co., xvi

Reamers—
Cleveland Twist Drill Co., Inside front cover

Rubber Goods—
Peerless Rubber Mfg. Co., xvi
Hukill Hunter Co., xvi

Safe Ends for Boiler Tubes—
National Tube Co., v

Index—Continued.

Side Stakes—
Pressed Steel Car Co., ... Outside back cover

Spring Buffer Blocks—
Gould Coupler Co., ... ii

Stay Bolt Iron—
B. M. Jones & Co. xiv
Sligo Iron & Steel Co. xviii

Stake Pockets—
Pressed Steel Car Co., ... Outside back cover

Stay-Bolt Taps—
Cleveland Twist Drill Co., ... Inside front cover

Steam Fire Extinguishers for Locomotives—
Nathan Manufacturing Co., ... iv

Steel Tires—
Latrobe Steel Co., ... iv

Steel Tired Wheels—
Railway Steel Spring Co. xiii

Springs—
Railway Steel Spring Co. xiii

Steel Cars—
Pressed Steel Car Co., ... Outside back cover

Steel—Mushet's—
B. M. Jones & Co. xiv

Tools—
Cleveland Twist Drill Co., ... Inside front cover

Trucks and Truck Frames—
Pressed Steel Car Co., ... Outside back cover

Valves—
Homestead Valve Mfg. Co. iv

Varnishes—
Sherwin-Williams Co., ... ii

Weldless Steel Flanges—
Latrobe Steel Co., ... iv

Wheels—
National Car Wheel Co., ... Inside front cover

Wooden Cars—
Pressed Steel Car Co., ... Outside back cover

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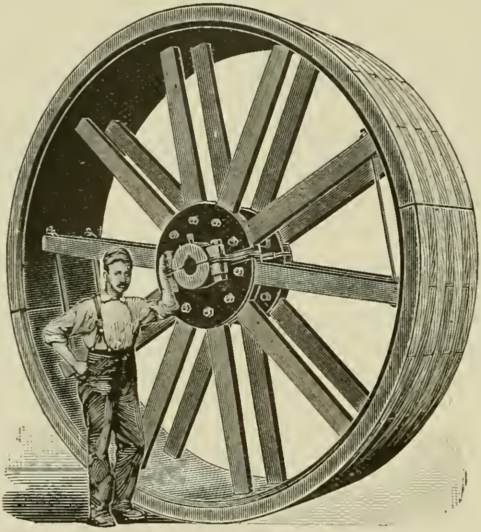

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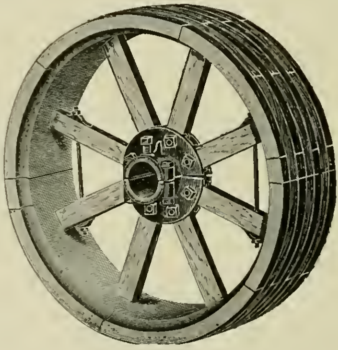

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of the

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ORGANIZED OCTOBER 18, 1901.

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Vol. III
No. 7.

Pittsburgh, Pa., May 27, 1904.

$1.00 Per Year
20c. per Copy.

Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, General Offices P. & L. E. R. R., Pittsburgh, Pa.

Meetings held fourth Friday each month, except June, July and August.

PROCEEDINGS OF MEETING,

MAY 27th, 1904.

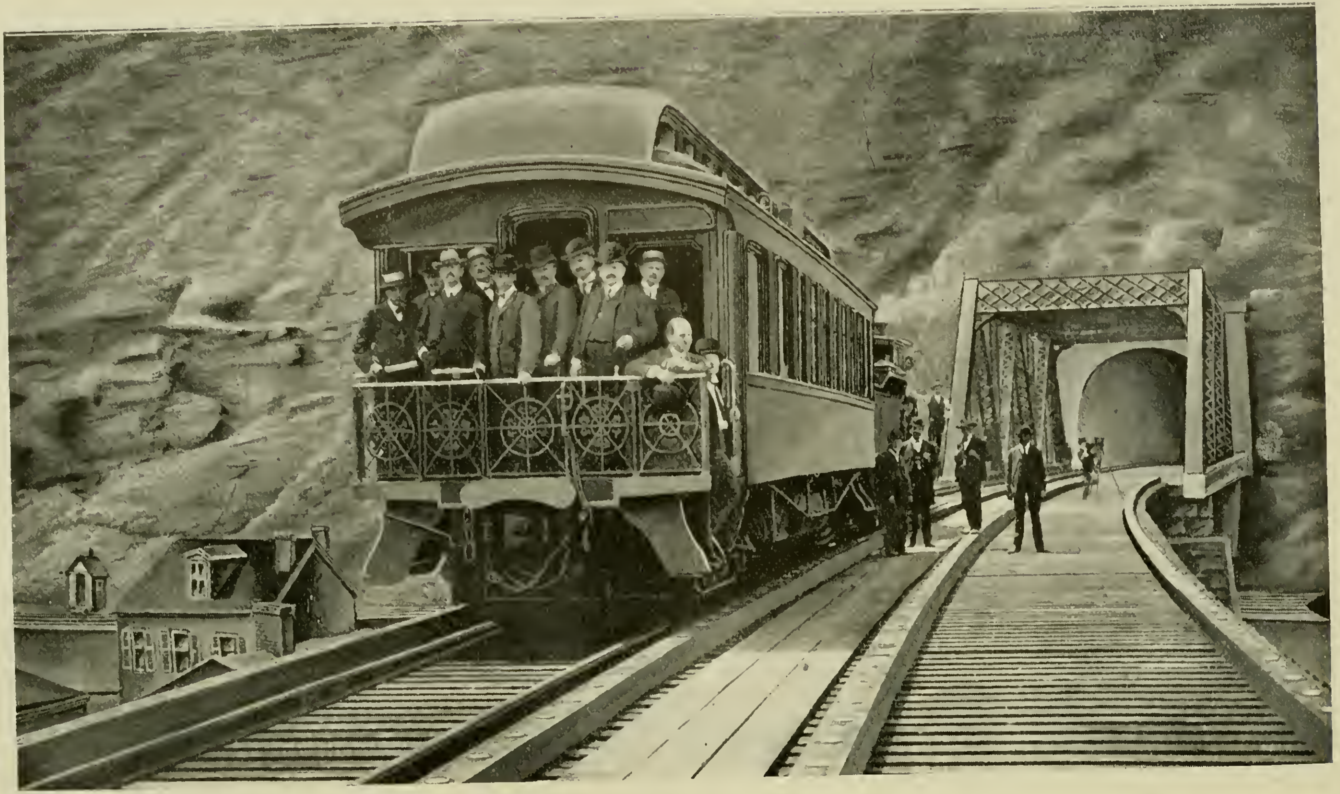
The meeting was called to order at 8 o'clock, p. m., at the Hotel Henry, Pittsburgh, Pa., with President L. H. Turner in the chair.

MONONGAHELA RIVER BRIDGE, WABASH PITTSBURGH TERMINAL RAILWAY.

The picture on the preceding page shows the entrance of the Wabash railroad into Pittsburgh. The whole scheme is a personal triumph of President Joseph Ramsey, Jr. It was accomplished by building the most notable cantilever bridge in the western hemisphere. Situated 2,300 feet above the junction of the Allegheny and Monongahela, the Monongahela river bridge carries the tracks of the Wabash Pittsburg Terminal Railway into the business district of the city of steel.

The conception was bold; the plan unique. The bridge begins at the face of the Mt. Washington bluff and ends at the elevated approach to the passenger terminal. With a channel span of 812 feet, the Pittsburgh harbor is crossed at a height of 70 feet above full pool. It is a double track structure, resting on caisson foundations sunk to solid rock 42 feet below the water surface. The substructure is of ashlar sandstone and concrete. The superstructure is a through pin-connected type of cantilever and contains 7,000 tons of steel. Messrs. Boller and Hodge, of New York, were the designing and supervising engineers. The plans and specifications were approved by Mr. J. W. Patterson, president and chief engineer. Mr. George T. Barnsley was the resident engineer in charge of construction.

The second picture is that of the first train over the Monongahela River Bridge, June 1st, 1904, showing President Joseph Ramsey, Jr., of the Wabash Railroad, with the inspection party on the South approach. On the rear of the private car Milan, beginning at the left, were: J. W. Patterson, President Wabash Pittsburgh Terminal Ry. Co.; A. M. Neeper, General Counsel; Joseph Ramsey, Jr., President Wabash R. R. Co.; Max G. Leslie, J. W. Patterson, Jr., Engineer Maintenance of Way; W. S. Newhall, Chief Engineer Wabash R. R. Co.; F. H. Tristram, Asst. Gen. Pass. Agt.; W. D. Holliday, Traffic Manager; Geo. T. Barnsley, Resident Engineer; E. D. Taylor, Secretary to Mr. Ramsey, and W. L. Ross, of the Pittsburgh Gazette.



The background shows the north portal of the Mt. Washington tunnel, 3,333 feet in length, where the south approach of the bridge ends. The view when emerging from the tunnel is a novel feature of the entrance into Pittsburgh. Suddenly a picture of the great "Smoky City" is flashed before you. On the right one sees a half dozen modern sky-scrapers, one of them, the Frick building, being the finest office building in the world.

(By kindness of Mr. Geo. T. Barnsley, Resident Engineer Wabash.)

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Shafer, W. L.
Smith, Sion B.
Turner, W. V.
Webster, T. F.

President: As the minutes of the last meeting are in the hands of the printer, if there are no objections the reading of them will be dispensed with.

Secretary Conway read the following proposals for membership:

F. H. Dukesmith, president, Dukesmith Airbrake Release Signal Co., Meadville, Pa.

F. E. McKee, electrical engineer, Pressed Steel Car Co., McKees Rocks, Pa.

Thos. W. Elder, engineering department, Pressed Steel Car Co., McKees Rocks, Pa.

President: As soon as these names have been favorably passed upon by the executive committee the applicants will become members.

Secretary Conway: We had a committee appointed two months ago to report on the best method of cleaning passenger cars. This committee have completed their report, but it has been deemed best to have the report of that committee carried over until September.

Secretary Conway read the following communications:

NEW YORK RAILROAD CLUB.

New York, May 19th, 1904.

Mr. J. D. Conway, Sec., Railway Club, of Pittsburg, Pittsburg, Pa.

Dear Sir:—The annual meeting of the Society of Railway Club Secretaries will be held at the United States Hotel, Saratoga, on Friday, June 24th, at 4 p. m.

The chairman hopes to see every member present promptly at the hour named.

Under the amending of the rules of order of the society last year, the president and first vice president of all clubs are entitled to participate in all our deliberations and exercise all privileges, with the single exception of voting for officers.

It is earnestly desired that they avail themselves of the opportunity thus presented. Very truly yours,

HARRY D. VOUGHT, Secretary.

ST. LOUIS RAILWAY CLUB.

St. Louis, April 29, 1904.

To the Publisher:—Kindly change your mail list for your paper being sent in exchange to this club, to read as follows:

St. Louis Railway Club,
Palace of Transportation, La. Purch. Expo.
St. Louis, Mo.

Arrangements have been made for a large room on the second floor of that building which has been fitted up with conveniences to comfortably care for members and their friends during the exposition season.

The furniture, library, etc., of the club and the various periodicals heretofore sent to the club room will be found there, and it is proposed to also invite organizations connected with the railway service to hold such sessions as they may desire therein. The quarters are ample to properly care for a good-sized gathering.

Members of sister clubs, "railroad men" generally, and the press are cordially invited to pay our headquarters a visit and to make themselves at home therein at any and all times.

Yours very truly,
E. A. CHENERY, Secretary.

President: The paper for the evening is upon the subject of Discipline. The gentleman who will present it does not require any introduction to the railroad men of Pittsburgh or of this vicinity. He is not at all thin-skinned, and if there are any blow-holes in his theories he will be glad to have you tell him so when the paper is presented for discussion. I am very glad to introduce to you Mr. J. B. Yohe, of the Pittsburgh & Lake Erie railroad.

Mr. J. B. Yohe: Mr. President and Gentlemen of the Railway Club, of Pittsburgh.

When your president first spoke to me with reference to presenting a paper on the subject of discipline I was somewhat embarrassed, because in glancing over the various topics which have been discussed before you in the past two or three years, I discovered that they were principally technical papers and I knew of nothing I could say upon the subject of discipline that would compare with the papers heretofore presented. I also realized that the subject allotted to me was not a popular one, and that anything I might say was sure to be criticised. However, upon personal assurance of your president that he, as well as the members, would welcome a paper not strictly technical, I undertook the task.

During my early career as a telegraph operator I was, on one occasion, disciplined by fine, and I have always felt that a great injustice was done me, inasmuch as the fine was imposed for sleeping on duty when it was absolutely impossible for me to keep awake owing to my extreme youth.

A few years later, when at the age of 18, I filled a train dispatcher's chair, through another's carelessness, I was involved in what might have been an accident, and for the first time in my life came face to face with the subject of discipline. The superintendent, whom I afterwards almost worshiped, called me to his office and talked to me precisely as related in the story of Mr. Lincoln. He told me that he did not propose to scold me, but that if I intended to be a successful railroad man I must be absolutely sure of every move. I returned to my work with the knowledge that his reputation was at stake and that he was responsible for my acts. That was the turning point in my life, as had he dealt harshly with me I would have resigned my position. I then and there made up my mind that if I succeeded as a railroad man and was ever in position to enforce discipline over others, I, too, would endeavor to treat them with a firm kindness and thus try to develop their better natures.

Therefore, I say that we need discipline in our maturity as in our childhood, for we are always in school.

> "We need discipline in our maturity as in our childhood for we are always at school: but the relation of teacher and public has been changed, and that change marks the difference between a restless and restful soul."

DISCIPLINE.

BY J. B. YOHE, GENERAL SUPERINTENDENT,
PITTSBURGH & LAKE ERIE RAILROAD.

In preparing a paper on the subject of "Discipline," I have found it somewhat difficult to confine my thoughts wholly to Railway Service, for the particular reason that there seems to have been but little advancement made in recent years in the method of applying discipline to railway employes.

We have lived to see the roadbed developed from that of the ancient saying—"A streak of rust and right of way"—to that of a solid foundation of stone ballast, stone arch culverts and steel bridges, all equipped with heavy steel rails of 90 and 100 pounds.

We have watched the growth of the locomotive from the tiny toy of brass and paint to the mammoth machine of to-day, almost without limit as to strength and speed.

Our freight car equipment has kept pace with the roadbed and locomotive, so that the car of to-day speeds along, bearing its mighty weight of 55 tons, representing a tower of strength and the greatest carrying capacity. Air brakes have taken the place of hand brakes, automatic draw-bars have supplanted the link and pin, all of which have been introduced mainly for the benefit and safety of the trainman.

These magnificent achievements are the result of the genius, wisdom and perseverance of that which our Creator has been pleased to call "Man."

The modern railroad has made ample provision for the care of its equipment; it is seldom abused or worked beyond its capacity; if any part fails it is replaced by stronger and more substantial material.

This leads the thoughtful and conscientious railway official to consider what he has done, or what can be done to bring the employe up to the standard of excellence attained in the development of roadbed and equipment. How shall we deal with our employes, they who are to make or mar our success; those who in the natural course of events will be our successors, and manage the great railways of this country?

We are taught that "Order" is the first law of the Universe, without which confusion follows, and inefficiency. The more complicated and extensive the organization, the more essential is orderly method. The test to be applied to any method of enforcing discipline is: "Does it secure for the end proposed the greatest efficiency?"

By this we are to understand that the enforcement of discipline is absolutely essential to the efficient management of a well-regulated railroad.

It has not been many years since it was the common practice on many leading railroads to discipline their employes by fine for violation of rules. We have no record as to how this plan originated. The one to be punished was usually made aware of his offense by receiving a letter from his immediate superior to the effect that he had been fined. We are morally certain that this system of enforcing discipline worked injustice to many a worthy employe, and instead of appealing to his intelligence by giving him an opportunity to explain and thus defend himself, it only impressed him with the fact that he had been unjustly dealt with, and as a consequence he no longer worked for your interest, the result being that he neglected his own interest, and dismissal was sure to follow. Right here is an opportunity for the unscrupulous official to impose on his men by inflicting fines for offenses he would not have had the moral courage to impose if he were brought face to face with the offenders.

As a "Twin Brother" to the practice of imposing fines for violation of rules, some roads demanded that full restitution be made for property destroyed by the one responsible for its destruction. This plan is also of ancient origin, and was doubtless copied from the Mosaic law—"An eye for an eye and a tooth for a tooth." There is a certain sense of justice in this method of "discipline by restitution" which we are bound to consider, but must discard as being impracticable in cases of serious accidents resulting in great loss of property.

This brings us to a discussion of the methods employed by the railroads of to-day in applying discipline. Have we solved the problem, or is it not a fact, as hinted at in the beginning of this paper, that we have made little progress in this direction?

On most of our railroads to-day the Division Superintendent is charged with the responsibility of conducting investigations and applying discipline; in this he is assisted by the Trainmaster. "Blue Monday" or "Court Day" is looked upon by the average employe with fear and trembling. He fears the result if he tells the truth, and he trembles, fearing that he may be found out if he does not tell the truth, so he approaches the Superintendent with the full determination of consolidating his feelings by telling as little as possible, and accepting the consequences.

It has been the observation of the writer that it is at this point where the average disciplinarian fails; not because he is not conscientious in his efforts to do justice, not because he lacks the courage of his convictions, but rather because the truth is withheld, and he must render his decision upon circumstantial evidence.

On other important railroads a board of inquiry is appointed to conduct investigations and apply discipline. This board usually consists of one officer from each department. It is thought that under this plan more facts are gleaned, and under the intelligent questioning of the examining board the employe is made to feel that if he tells the truth, the whole truth and nothing but the truth, he will receive justice. This system also has some objectionable features, the most notable being the disposition on the part of heads of departments to "saddle it onto the other fellow," and many a "Blue Monday" has been enlivened by a struggle between representatives of the transportation, mechanical and maintenance departments. However, the result is usually satisfactory to all concerned, and the employe generally accepts the decision of a board of inquiry with better grace than he would that rendered by any single individual, and there is also less liability of the case being appealed to a higher official.

All investigations, whether conducted by individual or board, should be fair and impartial, the decision reached should be based upon the evidence produced, and the sentence imposed without fear or favor, always, however, tempering justice with mercy.

It is at this point that Mr. Geo. R. Brown, until recently General Superintendent Fall Brook Railway, comes to our rescue with his plan of "Discipline of Railway Employes Without Suspension," which is the first and only radical departure from the old-time methods. Mr. Brown, in his book entitled, "A Railway Book for Railway Men," makes the following statement:

"The usual penalty for a serious violation of rules on American railroads is dismissal from the service. Minor infractions are usually punished by depriving the offender of employment for a fixed time—10, 30 or 60 days; a few roads have adopted the European practice of direct fines. In my estimation, as a rule, these forms of punishment are as unjust and inhuman as they are unnecessary.

"It is a well-understood principle in jurisprudence that a law without a penalty for its violation partakes more of the nature of advice than of law.

"The rules and regulations governing the running of trains on a railroad are laws and should be so considered, and penalties for their violation are not wanting.

"The responsible officer or officers of a railroad must act as judges, try every case, make every decision and punish every violator. It is not only their right, but their duty, to be strict in maintaining discipline. They have no right to excuse one offender and punish another, but must try every case on the calendar.

"Penalties are imposed for two purposes: First, to uphold the law and prevent its further violation; and second, to reform the violator.

"Punishment inflicted indirectly benefits thousands who do not violate the law, as well as the one who does.

"It often occurs that the disgrace and injury occasioned by a strict enforcement of a sentence does more to ruin the guilty than anything else, and a wise provision has been made, allowing courts to use their judgment as to carrying out punishments; this is known as 'suspending sentence.' If the sometime offender does better, and is not guilty of the same or other offenses, the judge conveniently forgets the indictment hanging over him, but should he go on committing one misdemeanor after another, his 'record' rises up to condemn him.

"I believe in the practice 'suspending sentence' with railroad employes.

"Officers of railroads differ from judges of the law, in that they make the law and enforce it, while the judge administers the law as he finds it. If the people are dissatisfied with the laws, they change them, but there is no appeal from the decision of the railway official, who performs the functions of judge, jury and executioner.

"Railroad officials who hire, discipline and discharge employes cannot be too careful in exercising their authority, and no honest one can afford to decide on a single case without first 'putting himself in the other man's place.' In other words treat him as he himself would consider just and honorable if the sentence was to be pronounced on him, and the decision should be made impassionately, impartially and giving him the benefit of all doubts.

"Every wreck, every accident, every mistake, every loss has taught its lesson, and these are of no less value to the railroads and to railroad men than the successes. I practice making every mishap a lesson to every man on the road.

"It often happens that an accident or a 'close shave' for one, is the best kind of a lesson to the man who could be blamed; and if he is retained in the service, he is a more valuable man than he would otherwise be or one who could be hired to take his place.

"I am afraid that it would do me no good, and would do me harm, to lay me off for 30 days for any offense; and I am sure I would do no better when reinstated than if I had been allowed to remain in the service. I should feel as if I had been ill-treated, as if my family had been deprived of the necessaries and comforts that my earnings afford them, and that they were the innocent victims of an injustice."

* * *

The latest statistics I have been able to get show that the Brown system has been tried on some of our leading railways, representing about fifty thousand (50,000) miles of road. The opinions expressed by those in position to know are varied, and whilst agreeing with Mr. Brown in principle, some differ in opinion as to the methods employed and results obtained.

I am of the opinion that a most thorough education on the part of employes as to the principle involved is absolutely necessary before the Brown system could be effectually introduced, and to properly educate on these lines railway companies should have the training of their subjects from the day they enter railway service. On roads that select their employes from the farm hands and country boys living along their line, the matter of education is comparatively easy, and any form of discipline, properly understood, could be intelligently enforced. On roads that are compelled to select their employes from those who have seen service on, or have been dismissed from other railways, and who are also compelled to reinforce their numbers from the floating element of railroad men, many of whom place but little estimate on the value of their positions, the question of education is far more serious, and experience has convinced me that in dealing with this latter class, the manager who insists upon his men being given a fair and impartial trial, and then imposes discipline by actual suspension or dismissal, obtains the best results.

The greatest care should be exercised by the official charged with the duty of conducting investigations. He should be a man of wide experience in railway service, one tireless in his efforts to secure all the facts in the case, willing to go over the ground personally, if necessary, so as to "put himself in the other man's place," and if, perchance he should discover that the one under suspicion has performed his duty to the best of his ability and understanding, he should not hesitate to overlook the offense, but first have a "heart to heart" talk with his man alone in his office, pointing out to him the effect of the accident on the reputation of his company, and on his own reputation as a railway official. On the other hand, if, after a careful personal investigation it is found that the one being investigated has misrepresented his case, made false statements, or withheld facts, he should be punished by actual suspension, or, if the circumstances warrant such a course, be dismissed. If extreme penalty is imposed it should be final.

As stated in the beginning, I have found it difficult to confine my thoughts wholly to railway service. We all have our ideals, and most of us endeavor to imitate them. I have found my ideal in the character of Abraham Lincoln, and confess that in dealing with the question of "discipline" among my employes, have given serious consideration to the motives which seemingly guided Mr. Lincoln in dealing with the great problems of his time. Will end my paper by giving an illustration of his method of discipline and its effect.

One William Scott, a private, had been on a long march, and on the night preceding had stood on picket. The next day there had been another long march, and that night Scott had volunteered to stand guard in the place of a sick comrade who had been drawn for the duty. It was too much for William Scott. He too was tired. He was found sleeping on his beat. It was in a dangerous neighborhood; "discipline must be preserved. William Scott is apprehended, tried by court-martial, sentenced to be shot. News of the case is carried to President Lincoln. William Scott is prisoner in his tent, expecting to be shot the next day. But the flaps of his tent are parted, and Abraham Lincoln stands before him. The record of that investigation is one of the interesting stories of the Civil war. Mr. Lincoln's decision after he heard the boy's story is related as follows:

"My boy, stand up here and look me in the face; you are not going to be shot to-morrow. I believe you when you tell me that you could not keep awake. I am going to trust you and send you back to your regiment. If from this day you do your duty, so that, if I were there when you come to die, you could look me in the face as you do now and say: 'I have done my duty as a soldier,' then my debt will be paid."

The promise was given; William Scott went forth to one of the awful battles of the peninsula and was mortally wounded. On his deathbed he said: "Boys, I have tried to do the right thing. If any of you ever have the chance, I wish you would tell President Lincoln that I have never forgotten the kind words he said to me—that I have tried to be a good soldier and true to the flag; and that now when I know I am dying, I think of his kind face, and thank him again because he gave me the chance to fall like a soldier in battle, and not like a coward by the hands of my comrades."

President: Gentlemen, it is very evident that Mr. Yohe's paper has been well received. There is not a man in the room to-night who is not in a position to govern or be governed, and many of you can talk very intelligently on this subject and we should have a good discussion. And I will ask Mr. Herr to open the discussion.

Mr. E. M. Herr: Mr. President and Gentlemen—It was with a great deal of pleasure indeed that I listened to the thoughtful and valuable paper of Mr. Yohe that has just been delivered. The question of discipline is one which has to me been of absorbing interest. It is some time now since I have been in active railway service, but during my railroad career it was one of the most interesting and at the same time the most difficult problem with which I had to cope.

The principles enunciated by Mr. Yohe and so thoroughly well elaborated and brought out, I am sure you all indorse. Especially valuable, it seems to me, is the discipline which Mr. Yohe so forcibly designates as a heart-to-heart talk. I am sure there are few of us who have not experienced the benefit of a good talk, and perhaps a good setting up from one of our superiors in the early days of our career.

The different methods of discipline as outlined, namely by fines, restitution and finally the Brown system as distinct from the system of suspension, or what is sometimes known as the record system, are very clearly set forth in the paper. But I feel that I must differ from the writer in his judgment of the results of the suspension by record, or the Brown system, and the necessity of a great deal of education before it can be satisfactorily administered. I remember very clearly the first time I heard of the Brown system. It was a good many years ago, now, I think about the time it was promulgated by Mr. Brown. My immediate superior asked me at that time what I thought of it. I told him I hadn't heard of it. He explained it to me, and said he would like to have me try it on my men. I thought the matter over and told him I thought it would not work. It would work all right on most of the men, but I had a lot that I was sure it would fail on. He said: "What are those?" I said they were the men in the Chicago yards. We had a pretty tough lot of fellows there, and I thought it was necessary to go after them with a club, and we had to be pretty severe in regard to our discipline to hold them in line. He said to me: "Suppose you try it." "Well," I said, "I will try it if you say so, but I am afraid these fellows will get away from me." He said, "Well, try it anyhow." I said: "All right, but I will consider that you are going to share the responsibility. But I will go at it." I did· I tried that for a year, on those boys, but I was convinced that I was going to wake up some morning and find the whole bunch of them out of my reach. But I must say that at the end of the year I had those fellows in better hand than I had ever had them before, and after that I had better disipline among those tough fellows in the Chicago yards than I had ever had on the system by suspension.

Now it seems there may be a reason for this, and it rests in this fact, which I think we all are pretty familiar with. There are no two men who conduct business in just the same way. Some men will be eminently successful on a method that another man would be in utter failure with. And it may be, and I think undoubtedly is, the case, that some officers can administer a system of discipline and get good results where others fail. But—and I hope you will pardon me for reciting my own experience—it impressed me very forcibly because I was exceedingly skeptical of the feasibility of the Brown system. But I must say that I was able to control my men better by that system and I had them better in hand, and I believe the men appreciated the purpose of the discipline better under that system than under the system of suspension.

And it seems to me that there are very good reasons why this should be so. As set forth in the paper, a man suspended feels that he has not only injured himself, but those dependent upon him may and often do suffer much more severely than he does. With the record system that is not true. He goes along with his work. Those dependent upon him have the benefit of his work and earnings, and yet he has the same rigid discipline as though he were laid off. Of course the fact is unquestionable, that was so well set forth in the paper, that a law partakes of the nature of advice unless it has some penalty attached. The penalty in the record system, of course, is ultimate dismissal. That is the real penalty that the officer can inflict. But it has more penalties than that.

The method we used in handling this system was to write the man a letter, of course after an investigation has established his blame for any particular infraction of the rules or accident, stating that on a certain date such and such things occurred, reciting briefly and accurately as the investigation enabled us to do, the facts of the case. And closing the letter by saying "this will be made a record against you" for the infraction of the rule or whatever it was. Before putting this into effect a bulletin was issued and posted publicly that on and after a certain date this method of discipline would be placed in effect, and a man receiving one of these letters would be considered as conceding that the facts were recited correctly and justly if he did not notify within ten days the officer from whom he received the letter.

When this letter was sent him a bulletin was also posted reciting briefly the facts under which the accident occurred or the infraction took place, in an absolutely impartial way, that on such a date at such a place such things happened. Further this investigation showed that the conductor or engineer or brakeman or whoever it was, was responsible, and the record had been made against them. That is all that was stated.

Now I have frequently had men come to my office on receipt of a letter of that sort and say, "Mr. Herr, I don't want you to place that against my record. I would sooner take 30 days than have that go against my record. I never did a thing like that before and I don't like to have that go against my record." Here it seems to me, is an exceedingly important part of the record discipline. He felt that he did not like to have that on his record. He would sooner take 30 days, and then it would be wiped out and he would be free. And he felt that if that went on his record he would never get it off. There is the place where it would be unjust to the man. I would tell him that unfortutnately I was not making his record, he was doing that. I was simply keeping the books, and unless I kept them accurately they would be of no account. I was utterly unable and it was beyond my power to withhold anything from his record that was justly and fairly recordable. But I would say, "You better go to work and wipe that out." "How can I do that?" "You can do that by doing your work so well, by serving the company so faithfully, by being so satisfactory in your general deportment and behavior, that I will be justified in writing you a letter commending you for your diligence or faithfulness, or whatever his particular merit was, and I will be more than glad to record that on the other side of your record and balance up this account that is now going against you, and then your record will be clear. And I always took great pains whenever it was possible to do so to notify the men of it. And the results were very good indeed. The men appreciated it and worked to have things removed from their record when they got a bad one. And we had the services of the men at the time, when under discipline by suspension we would have lost them, and that was the time when we were busiest, when things are going hardest for the men and for the officers, and when it is difficult to get men to serve the company properly. Men are then more apt to get into trouble and to need discipline, and that is the very time you need men, skilled men and trained men, and by laying them off you put less skilled men in the service, and thus interfere with it instead of bettering it.

Now this discipline by record is not by any means automatic. It requires, I think, a little higher skill and greater effort on the part of the disciplining officer than discipline by suspension, because when you put a thing on the book, it is there, it is in black and white, it comes up before the men again. If they serve 30 days for it, it is wiped out, it is done, and it is not again held up against them. It has been my experience that discipline by record is, and can be made—and if not very carefully guarded will necessarily be—an even more severe method of discipline than any method by suspension

I have already taken up too much of your time, and there are others here better able to talk on this subject than I am. I thank you.

President: We have with us to-night a member who knows the value of discipline in other lines than railway operation, and I will call on Dr. Scott, of Cleveland.

Dr. X. C. Scott: I had no idea when I came here that I was to be called on. But I think the suggestion of the gentleman a few minutes ago is exceedingly unfair. No court in the land, and God Almighty himself would not deny a man the right to be heard before being condemned. A man should always be heard before he is condemned or a record put against him. It is absolutely essential to have discipline. Unless we have discipline things are all in confusion. Fairness to those who are in our employ, under our care, and good work for the company demand it.

Another thing which struck me in listening to the paper to-night is this. When the Division Superintendent or Train Master condemns a man there should always be a right of appeal. He should be heard. That is only just. Nobody is condemned in this world without the right of appeal, in any of our courts, and I do not see why railways should be above our courts. No man should be condemned before he has had a hearing.

President: We have heard from the medical side. I see in the audience a gentlemen who has had experience in military life, as well as in railroad operation, and I will ask him Colonel Schoonmaker to talk to us.

Col. J. M. Schoonmaker: Mr. President and Gentlemen—I can only point to my being here to-night as an illustration of the discipline that prevails among those of us who are in any way connected with the gentleman who read the paper to-night. Some days ago, when my desk was pretty full, Mr. Yohe called on me and said this would be the last meeting of your Club for some little time and he wanted a large turn-out of the boys, and he thought I had not shown up as often as my duty under the circumstances required, and inasmuch as he was going to read a paper he would like very much to have me here. He followed his remarks with the statement that he was not at all pleased with his paper, it was not at all to his satisfaction, but he was going to cover the field pretty generally and he hoped I would go.

I hesitated a little because of that remark. It seemed to me that I did not want to share in any disappointment that might follow, or undertake to criticise anything that Mr. Yohe might say or do. I felt for the time being as if I would like to take a chance on that proposition and do as a friend of mine did shortly after the war in Louisville, where I was keeping books for a white lead factory. There were only half a dozen of us Yankees in that country, and this gentleman was very much on the other side. There were half a dozen of us "Yanks" who have since gotten into some public prominence. There was Griscom, Secretary of the Interior of the United States; there was Abe Wharton, at the head of the District Court in that district; Governor Murray, of Utah; Judge Ballard, who sentenced a moonshiner notwithstanding the fact that his followers were shooting right and left. In fact we all followed the Kentucky custom at that time that constituted a perfect gentleman—we carried our gun with us all the time in our hip pocket ready for any emergency.

One of our friends, an able story teller he was, too, one Sunday afternoon came in the room where Wharton and Griscom and Murray and myself were sitting together, and he says, "Let us work off a joke on Lee if he undertakes to get off one of his long stories. We will find opportunity to drop out as the story goes along, and let the last fellow take the chance to break away just when the point of the story is to be reached." Well he came along, and unconsciously he drifted into a story. As he began I pulled my watch out and said, "Will, I am sorry but I have an engagement and I will see you again," and bade him good day. The story had gone but a little further when Griscom says, "Hold on, I am going your way. I will see you again, Will." And he followed after me, and we left the other two. Murray watched the door pretty carefully, and when Lee got fairly started in his story, he says, "I am awfully sorry, but I have got to go right now." Lee's countenance fell, and he was very much hurt. But Murray went off and Wharton watched the development of the story with great interest, and just as the story reached the climax he said, "I am sorry I can't wait another minute, but I have got to go." Lee put his hand down to his hip pocket and he says, "Abe, these other gentlemen have gone and insulted me, but I will be damned if I am going to let you do it. You will hear this story out, and it is a good one, too." That you see was a rather serious joke. "Well," he said, "go ahead." And under those conditions you know how very embarrassing it would be to try to tell a funny story. But he went on and reached the climax of the story. Abe, who was a big fellow, straightened himself up and said, "Will, is that the story you wanted to let loose?" "Yes," he says, "and it is a good story. Don't you like it?" And he answered, "No, Will, I am awfully storry I didn't let you shoot." I didn't know whether to come here to-night and take the chances of getting shot.

No, I don't believe this was that kind of a paper. There was lots of meat and lots of thought all through it. Every gentleman present will agree with me that there are no two in this room constituted just exactly alike. An all-wise Providence, for his own uses, has made us all somewhat different, just as he has made every leaf on every tree in this beautiful spring somewhat different. As the leaves, we are all men, but we are not exactly alike, and there is no iron-clad rule, as I apprehend, that could be built to suit my case precisely in its littlest detail, that would fit exactly my friend Mr. Hoffman, just as my suit of clothes would look peculiar on him, though it would still be a suit of clothes. I only use that as an illustration of the fact that we cannot make iron-clad rules of discipline, neither on the railroads, nor in commercial business, nor in the professions, nor, as your good President has referred to it, in our army experience.

Now actual discipline in the army is much more easily obtained than it is on a railroad or in the doctor's profession or in any other vocation, because the conditions make it possible. It is because of the strong arm of the commanding officer, it is because of the knowledge of the fact that punishment is certain and sure and often violent. It is because of the conditions that exist that produce results somewhat like those that are produced when we go to the circus and see the man or woman go in with the man-eating tiger. There is discipline. What kind of discipline? It is the discipline of the red-hot iron, that drives that animal from one end of that cage to the other. It is afraid. That sort of discipline would not do for the thinking, reasoning man that is in our employ.

It has been my experience—and it has been somewhat extended in both military and civilian life—that somewhere in every temperament and in every disposition, in the constitution of every man that I ever met, there is a button which if you can reach and touch, you can develop something good in that man. You may touch a dozen and not hit the right one, but if you reach that one button you can reach the innermost man, no matter how degraded, and you will have the opportunity of developing out of that little beginning, probably enough leaven to leaven the whole lump. Sometimes I would think it impossible, but extreme measures ofttimes brought about the very results, and men who for one reason or another were seemingly absolutely worthless it was possible to make good men of.

Now those who have been leaders, in whatever phase of life, will agree with me that sometimes the exercise of discipline is just as severe a task and just as trying, and oftentimes accompanied with as much suffering and heartache and disappointment, to the superior as to the victim. But that does not change the principle nor does it make impossible the carrying out of a system of discipline that is so absolutely necessary to bring good results, either in the medical profession or in the railroad profession or in the military profession. We got good results from discipline in the army by more than one method. One was punishment. Another was by an appeal to moral courage. And I am free to say that we accomplished more in the latter direction than in any other. But the ordeal was severe. The temperament of the individual himself often completely changed, so that men under the trying circumstances of the line of battle, or in the dangerous positions, or sitting with his saber at his right hip and his bridle line in his hand and knowing that in a few minutes he would be sent off to certan death, then it took a lot of nerve force and moral courage to command a lot of men who were likely in a moment to be transformed into the fright of absolute panic—for it is notoriously true that there is no animal to-day that is susceptible to panic conditions equal to the human animal. A sheep will run off and get over the fence, and all the other sheep will follow it. They don't know why, but they go. Now every man under those circumstances would have a reason for what he was going to do, but reasoning with him would be impossible, so that absolute control is imperatively necessary. And it is a foundation principle to keep our men free from disturbing conditions and appeal to their moral courage, so that I have sat on my horse and looked in the faces of men who had driven their teeth into their lips until the blood ran down their chins, yet they were wholly unconscious of the fact that they were suffering pain. Men under stress of such circumstances had to be disciplined, and the discipline was severe. But we always accompanied that with corresponding commendations and rewards for the men who thus unflinchingly performed their duty.

We did have sometimes pretty severe work to bring about the discipline we sought to effect. I have in mind a striking instance that occurred in my office only a few weeks ago. When my regiment was organized here and taken into the field, a lot of personal disappointments followed the amalgamation of the companies. Many men who had expected to be made captains were necessarily reduced to the ranks. Among such was a young physician from Uniontown, Ed. Bynum, who had organized a company and naturally expected to be made its captain, but was reduced to the ranks and went with the company as sergeant. In his extreme disappointment he became the most refractory man I ever had anything to do with before or since. He was educated, he was above the level of his surroundings, he was a great big powerful fellow, self-willed in the extreme. And he started out to make all the trouble he could possibly make, regardless of advice, counsel or threat. These conditions were kept up, and I found them still rampant after going down to Washington to get my orders. The night I got back to camp was a cold November night. And about 9 o'clock the officer of the guard came up and said Ed. Bynum was out of camp and drunk and raising h—ll. And the Colonel told me he had had no end of trouble. He was drunk when they left Pittsburgh, and they had to bind and gag him in the car, and they could do nothing with him at all. The Colonel was awfully glad that I was home, and he would like to have me take that drunk off his hands.

I sent for a detail and went down to Hagerstown and found Bynum drunk in a saloon, and brought him up, under guard, to my headquarters. I saw the condition and knew it was an extreme case, and one or the other of us would come out victor. I sent an orderly around behind my tent and had him bring a lariat, and I told him to take Bynum over to that oak tree and back him up to it and tie him with that lariat to the tree with his arms behind the tree, but giving him room enough to move about the tree. I ordered a detail of a corporal and three men to stand guard over him, and I said to the corporal, "I do not want any one to loose this man until I take the ropes off him myself." Then I went into my tent and took off my clothes and went to bed. It was late in November and a pretty cold night. I tried pretty hard to sleep, but every once in a while I thought, that is pretty tough, that man is drunk out there, it is cold—and yet I did not dare to relax my purpose one iota. I got only little snatches of sleep all night. I know that I suffered more in that night than Bynum did out under that tree. But when daylight came next morning I got up, put my uniform on, my sash and saber and my revolver, and went out. There was Bynum, sober, but his lips as blue as indigo. He had tramped all around that tree that night to keep warm. I went right up to him. I don't think I ever saw vengeance and retaliation depicted in a countenance in my life as I did in his face. I said to him, "Bynum, you have been making trouble ever since you enlisted. You have been constantly drunk, you have been in the guard-house, you have been bucked and gagged, and now you have been tied up to a tree all night. This is only a patch to what is yet to follow if you dare to disobey an order of this regiment. And I promise you, and promise you as I look you in the eye (and I looked him square in the eyes) that if the offense warrants it, I will court-martial you and drum head you in the evening and shoot you at daylight. One or the other of us is going to run this regiment, and if you want to cross swords with me you can keep on doing it." I turned right around and went back. Then I went to him and I said: "Now, Ed., I know all about you. You are from a good family, you are a graduate physician, you are away above the level of the men you are with. Your example ought to be for good as much as it is now for bad. There is a lot of good in you. I know how you were disappointed. You ought to have been made a captain; you were made a sergeant and were reduced from that to a corporal and even the corporal's stripes were cut off from you, and now you are the lowest-down private in your company. It is all dead wrong. You are too good a fellow to be lost to the service of the Government. You offered this Government your life for its preservation. That is principle. Now why fly in the face of it? There is a lot of opportunity for you, there are a lot of chances for you, more than for the average man in your company. And I want you to promise me something. I want you to promise me that if I give you just one more chance you will do the right thing. If you will promise me that, you will have the best friend you have got in that regiment with you." Then I saw the tremble in his lips and I saw the tears in his eyes, and I continued. Finally he broke down. He said: "My God, Colonel, if you will give me just one chance I will show you what kind of a soldier I will be." Said I, "That is enough." I took the rope off and took him into my tent. Says I, "You want a drink the worst kind of a way, and I am going to give it to you. And I want you to promise me that that will be the last drink you will ever take." Said he, "Before God I will." And he tossed that drink down his throat and shook hands with me. Not a soul to guard him, nobody in the tent but myself, and I was only a little over 20 years old. He could have whipped the life out of me alone. He said, "My God, do you mean what you said, Colonel." I said "Yes, I do." And we shook hands and he went out.

To make a long story short, when the war ended Edward Bynum was medical director in charge of all the army hospitals at Cumberland, Md., a Major in the regular army service, and one of the most popular and one of the ablest surgeons we had in the entire army. And his management and discipline of that hospital he told me time and again was framed upon what he had learned that night under the tree. Said he, "You touched the button, and I owe it all to you."

Shortly after the war Bynum went to Salt Lake City and became a very prominent and influential citizen, and became the owner and editor of one of its leading papers. Once in a while I got a letter from him. He had seen somebody or had heard something and he wanted to keep up our recollection. And then we would exchange letters, and a year or two would go by without another.

Three weeks ago a lady in black came into my office. I got up to receive her. She said, "Colonel, you don't know me." "No," I said "I guess I don't." Said she, "I am Ed. Bynum's widow." Said I, "You don't mean to tell me Ed. Bynum is dead." "Yes, he died about three months ago, and I closed out all his interests out there and I am going back to my father again. Ed. told me over and over again the story of the tree down at Hagerstown, Md., and the turning point that was in his life, and how his whole course in life was changed by that incident that night when he found he could get another chance. And his life was perfectly beautiful. And I wanted to stop over in Pittsburg simply to come in and pay my respects to you as an old friend of Ed's."

Now I thank you for your indulgence. I only want to illustrate what seems to me should be a constant and careful study on our part. I am a firm believer in discipline. It is absolutely essential to success in every business or public enterprise, and especially in railroading, where not only the property, but the lives themselves of people are dependent upon the eternal vigilance of everyone connected with it. I believe in having these conditions so manifest and so plain that the man who violates them is self-condemned, and cannot object to the punishment which necessarily must follow, and should follow. I believe with Dr. Scott in giving him a fair show, but I do not believe in giving him the constant right of appeal. Dr. Scott is in error when he says every man has a right of appeal in our courts. If I have a claim of $5 against Mr. Yohe and go to a magistrate and bring suit to collect it, there is no appeal from the magistrate's decision. If it is a larger claim I go to the courts, and I cannot get beyond a certain court unless the claim is more than a certain amount.

These men ought to have a fair hearing, and the sensible man will give them a fair hearing. But if the determination of that hearing makes it plain that that man's violation was clear and direct, I believe in inflicting punishment as you have ordered, or you should not have ordered it. You weaken your own discipline if you do not bring to him definitely the fact that this is the result of his own act, for which he alone is responsible. There is no trouble. With reasoning man it can be made plain that he has only himself to blame. And it is equally plain to me, and it must be to you, that if you temper justice with mercy—and my whole temperament is to lean a little farther in this direction than is probably wise—you win firmer friends and better service.

I thank you for your kindness.

On motion of Mr. F. T. Hyndman, a vote of thanks is extended to Mr. Yohe and to the gentlemen participating in the discussion, for their interesting remarks to-night.

On motion, adjourned.

Pittsburgh, Pa.

["COMMUNICATED."]

On the occasion of the Meeting of the Railway Club of Pittsburgh, held at Hotel Henry, on the evening of May 27th, the subject of Discipline under discussion, an opportunity was there given me to say a word that I then and since have regretted that I failed to avail myself of. I knew I was not a speaker and the occasion being my first introduction into the Brotherhood, I wanted to enter its family circle quietly and as a learner. Yet, I was so impressed by the spirit, the essence of the words of the speakers that I deem it worthy that they should be emphasized.

Our friend, Mr. Yohe, in his address, after quoting from Mr. Brown's system of Discipline, told us "that in his opinion a most thorough education on the part of employees as to the principle involved is absolutely necessary before the Brown system could be effectually introduced, and to properly educate on these lines Railway Companies should have the training of their subjects from the day they enter the Railway service''. In other words, he told us to "teach and to train'', the very essence of the meaning of the word Discipline.

In his next paragraph he told us "to put yourself in the other man's place, and if perchance you should discover that the one under suspicion has performed his duty to the best of his ability and understanding, you should not hesitate to overlook the offense but first have a heart to heart talk with his man alone in his office.'' Alone in his office the door shut. In his dealings with his unfortunate or erring brother he needs to be alone with him that there might be more freedom of heart-appealing to the heart, a Voice from within is to speak and to lift up.

Our friend from Cleveland, Ohio, strongly urged that the one to be disciplined be given an opportunity to be heard, and referred to the custom practiced in civil courts. He also pleaded for Justice and surely was prompted in so expressing himself by that same Voice from within.

But more pointedly and more emphatically did the worthy Vice-President of the Lake Erie emphasize this same manner of disciplining. He told us of his wakefulness and his wrestling with himself alone in his tent during the night preceding the morning he was to meet the Giant Erring Private face to face, wrestling not because of any fear of him, for one that knows the Colonel, knows his courage, and, although he did don his sword and his pistol, yet in his dealings with this misguided man, the only weapon he mentioned as having made use of was the "Sword of the Spirit.'' With this alone he won and conquered him. The last word used by the Colonel was "Mercy.''

If, in these simple words I have correctly stated the essence of the argument made, and if I may refer to the high standing and achievements of the gentlemen who offered them, for we do know they had been successful in their affairs, may we not ask if it is not very clear that they have been learners of that Man above all others "who knew men,'' who knew what was in man'', "who was always just, Merciful and Good'', who never made a mistake, whose investments and interests are of more value than all others?

If, then, all others of us will do as our speakers must have done, study His life and His work and be so controlled in dealing with men as they have been, be just as He is just and merciful as He is merciful, we cannot fail in Discipline nor in the uplifting of the interests entrusted to our care.

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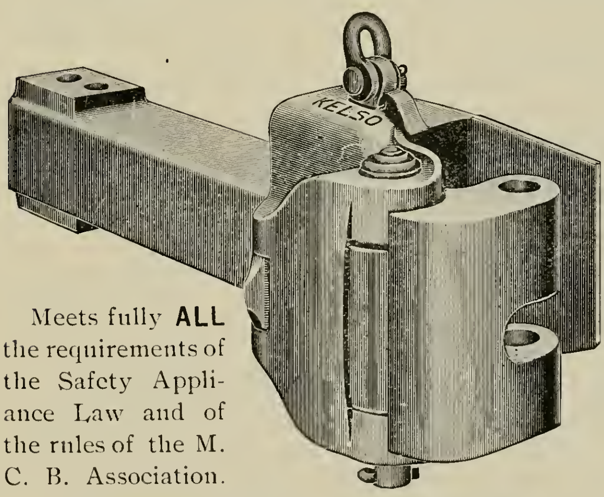

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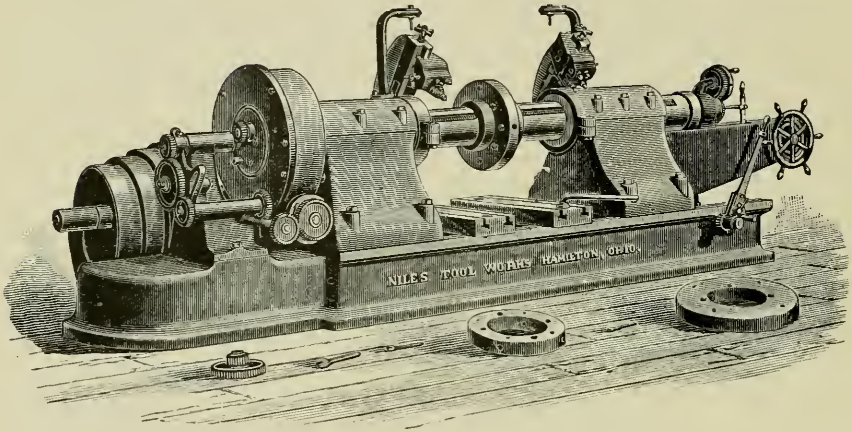
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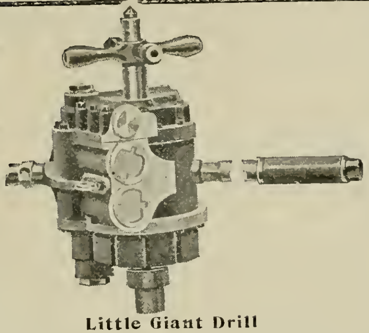

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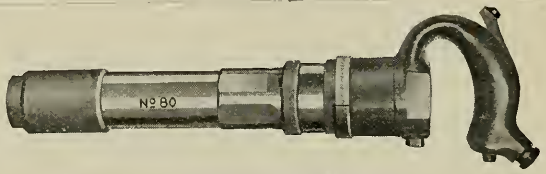

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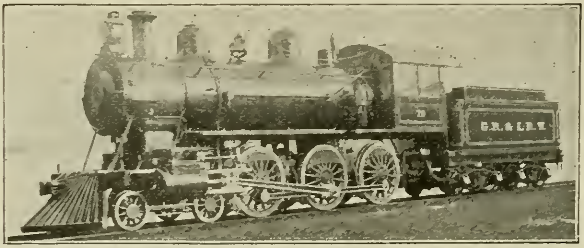

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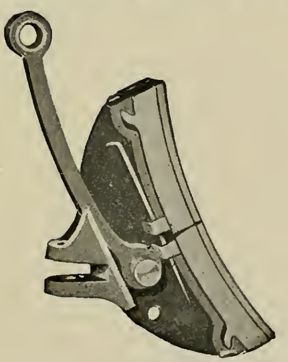

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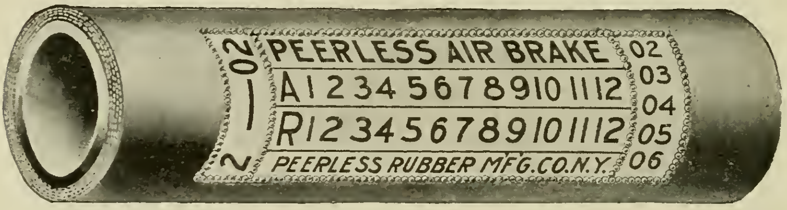
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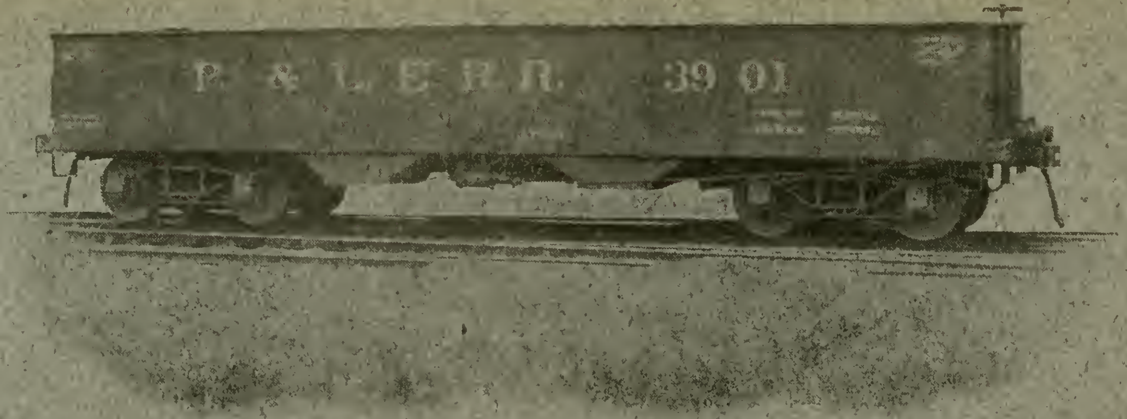

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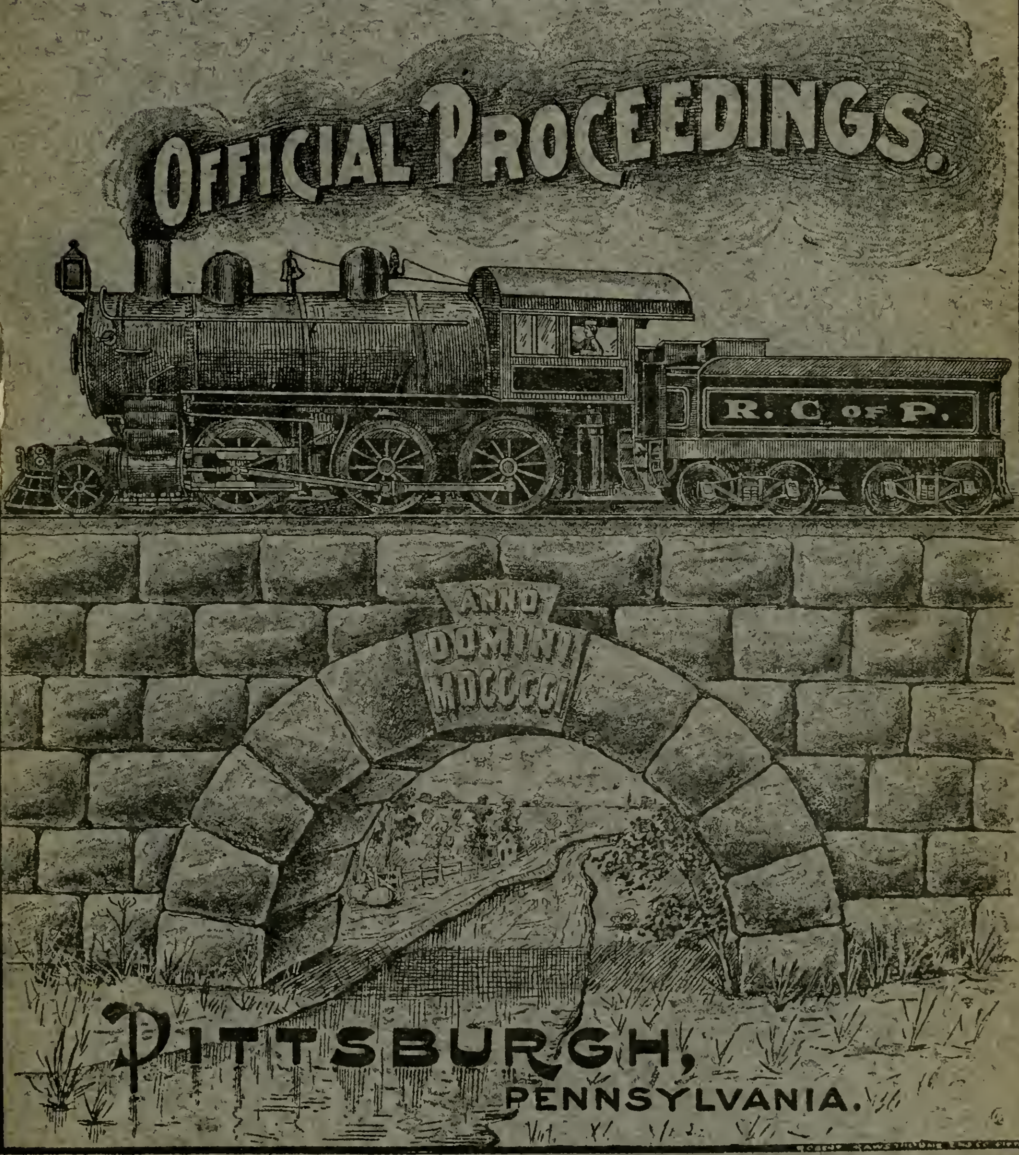

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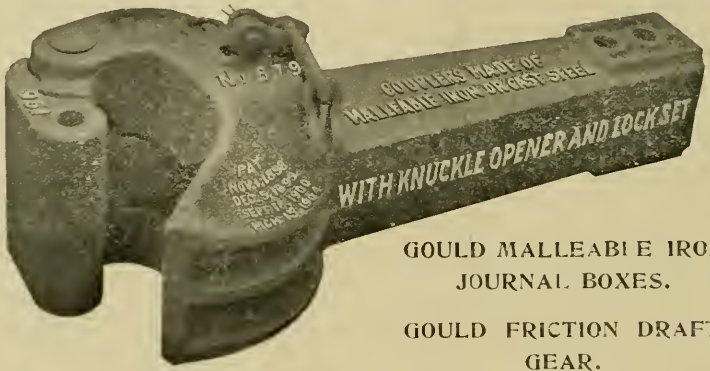
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Classified Index of Advertisements

Air Brakes—
Westinghouse Air Brake Co... ix

Air Compressors—
Chicago Pneumatic Tool Co.......... xiii
Manning, Maxwell & Moore........... xv

Babbit Metal—
Damascus Bronze Co., Inside front cover
Lawrenceville Bronze Co ,............. xi
Magnus Metal Co.,.................... vi

Belting—
J. D. McIlwain & Co.,...................... x
Hukill-Hunter Co.,.......................... xvi

Boiler Washers and Testers—
Nathan Manufacturing Co.,............ iv

Boiler Lagging—
Franklin Manufacturing Co........... xv

Boiler Tubes—
National Tube Co.,..................... v

Bolsters—
Pressed Steel Car Co.,......................
Outside back cover

Brass and Bronze Castings—
Damascus Bronze Co.,......................
Inside front cover
Lawrenceville Bronze Co.,.............. xi
Magnus Metal Co.,.......................... vi

Brake Shoes—
American Brake Shoe & Foundry Co. ii
Hukill-Hunter Co.,.... xvi

Car Couplers—
Gould Coupler Co.,........................... ii
McConway & Torley Co.,................. xi
National Malleable Castings Co.,..... vi

Car Heating and Lighting—
Gold Car Heating Co.,...................... vi
Safety Car Heating and Lighting Co. xiii

Castings—Malleable Iron—
National Malleable Castings Co.,..... vi

Coal and Coke—
Washington Coal and Coke Co.,...... xii

Conveying Machinery—
J. D. McIlwain & Co.,...................... x
Manning, Maxwell & Moore............ xv

Corner Bands—
Pressed Steel Car Co.,......................
Outside back cover

Drills—Twist —
Cleveland Twist Drill Co.,...............
Inside front cover

Friction Draft Gear —
Westinghouse Air Brake Co.,........... ix

Graphite—
Jos. Dixon Crucible Co vi

Hoisting Engines—
J. D. McIlwain & Co ,....................... x

Hose Clamps—
J. D. McIlwain & Co.,........................ x

Injectors—
Nathan Manufacturing Co.,............ iv

Jacks—
J. D. McIlwain & Co.,....................... x
Hukill-Hunter Co............................ xvi

Journal Bearings—
Damascus Bronze Co.,......................
Inside front cover
Lawrenceville Bronze Co.,...... xi
Magnus Metal Co.,........................... vi

Locomotives—
American Locomotive Co.............. xiv

Lubricators—
J. D. McIlwain & Co.,........ x
Nathan Manufacturing Co.,............ iv

Machine Tools—
Niles Tool Works,.......................... xii
Manning, Maxwell & Moore........... xv

Magazines—
Railway Age................................ iii

Malleable Iron—
Fort Pitt Malleable and Grey
Iron Co...xvii

Oils—
Galena Signal Oil Co.......... xvii

Oil Cups—
Nathan Manufacturing Co.,............ iv

Packing—
J. D. McIlwain & Co.,....................... x
Franklin Manufacturing Co.,.......... xv

Paints—
Sherwin—Williams Co.,.................. ii
The Lowe Brothers Co.,.................. xvi
M. B. Suydam Co. i
Chas. R Long, Jr.......... iii

Paint Machines—
J. D. McIlwain & Co.,....................... x

Pipe and Pipe Fittings—
National Tube Co.,.......................... v

Pipe Joint Paste and Compound—
Jos. Dixon Crucible Co.................... vi

Pneumatic Tools—
Chicago Pneumatic Tool Co,.......... xiii
Manning, Maxwell & Moore........... xv

Pulleys—
J. D. McIlwain & Co.,...................... x
Hukill-Hunter Co.,........................ xvi

Reamers—
Cleveland Twist Drill Co.,...............
Inside front cover

Rubber Goods—
Peerless Rubber Mfg. Co.,............. xvi
Hukill Hunter Co.,................. xvi

Safe Ends for Boiler Tubes—
National Tube Co.,.......................... v

Index—Continued.

Side Stakes—
Pressed Steel Car Co., ... Outside back cover

Spring Buffer Blocks—
Gould Coupler Co., ... ii

Stay Bolt Iron—
B. M. Jones & Co. xiv
Sligo Iron & Steel Co. xviii

Stake Pockets—
Pressed Steel Car Co., ... Outside back cover

Stay-Bolt Taps—
Cleveland Twist Drill Co., ... Inside front cover

Steam Fire Extinguishers for Locomotives—
Nathan Manufacturing Co., ... iv

Steel Tires—
Latrobe Steel Co., ... iv

Steel Tired Wheels—
Railway Steel Spring Co. xiii

Springs—
Railway Steel Spring Co. xiii

Steel Cars—
Pressed Steel Car Co., ... Outside back cover

Steel—Mushet's—
B. M. Jones & Co. xiv

Tools—
Cleveland Twist Drill Co., ... Inside front cover

Trucks and Truck Frames—
Pressed Steel Car Co., ... Outside back cover

Valves—
Homestead Valve Mfg. Co. iv

Varnishes—
Sherwin-Williams Co., ... ii

Weldless Steel Flanges—
Latrobe Steel Co. iv

Wheels—
National Car Wheel Co., ... Inside front cover

Wooden Cars—
Pressed Steel Car Co., ... Outside back cover

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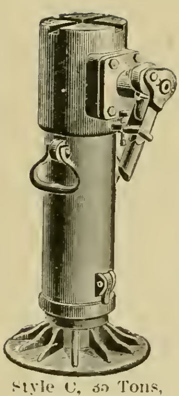

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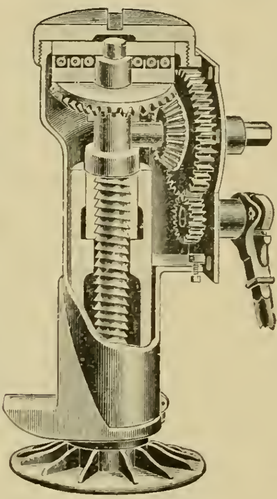

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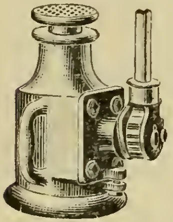

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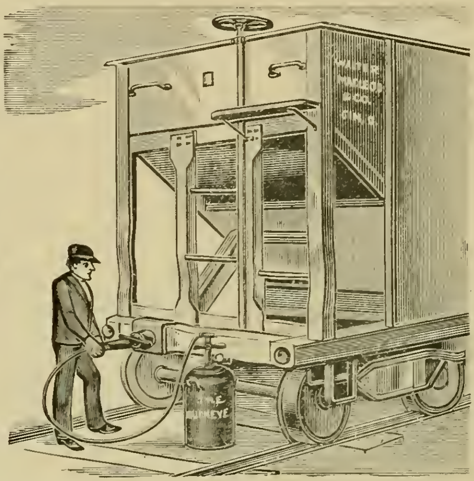

OFFICIAL PROCEEDINGS
of the
Railway Club *of* Pittsburgh.

ORGANIZED OCTOBER 18, 1901.

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Supt. Motive Power, P. & L. E. R. R., Pittsburgh, Pa.

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Chief Clerk, Supt. M. P., General Offices P. & L. E. R. R., Pittsburgh, Pa.

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Gen'l Manager Westinghouse Air Brake Co. Pittsburgh, Pa.

C. L. GIST,
Superintendent Transportation, P. & L. E. R. R., General Offices, Pittsburgh, Pa.

F. H. STARK,
Superintendent Rolling Stock, Pittsburgh Coal Company, Coraopolis, Pa.

Vol. III.
No. 8.

Pittsburgh, Pa., September 23, 1904.

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Published monthly, except June, July and August, by the Railway Club of Pittsburgh,
J. D. Conway, Secretary, General Offices P. & L. E. R. R., Pittsburgh, Pa.

Meetings held fourth Friday each month, except June, July and August.

PROCEEDINGS OF MEETING,
SEPTEMBER 23d, 1904.

The meeting was called to order at 8 o'clock, p, m., at the Hotel Henry, Pittsburgh, Pa., with President L. H. Turner in the chair.

The following gentlemen registered:

MEMBERS.

Allen, J. P.
Ayers, H. B.
Barney, H. E.
Barnsley, Geo. T.
Barwis, J. McC.
Bole, Robt. A.
Brittain,, Jno. B.
Buchanan, W. J.
Chittenden, A. D.
Conway, J. D.
Courtney, D. C.
Cunnigham, J. D.
Dunn, F. L.
Evans, S. D.
Frank, L. W.
Gilbert, E. B.
Gist, C. L.
Grove, E. M.
Hastings, C. L.
Holbrook, D. O.
Horner, H. G.
Howe, D. M.
Huyett, E. G.
Hyndman, F. T.
Jenny, Jacob
Kessler, D. D.
Knight, E. A.
Lanfersiek, Jno. F.
Laughlin, C. W.
Lawson, S. S.
Lee, L. A.
Lindstrom, C. A.
Lininger, W.
Lobez, P. L.
Mason, S. C.
Milligan, J. D., M. D.
Miller, Geo. W.
McCaslin, A. W.
McConnell, C. H.
McConway, Wm., Jr.
McIlwain, H. M.
McIlwain, J. D.
McKee, F. E.
McKee, S. F.
McMullen, F. V.
McNamara, D.
McNulty, F. M.
Noble, D. C.
Oates, Geo. M.
Porter, H. V.
Prosser, C. S.
Quest, W. O.
Redding, D. J.
Rhodes, G. P.
Scheck, H. G.
Shaler, F. J.
Slocum, A. W.
Smith, D. W.
Stark, B. F.
Stratton, G. W.
Stucki, A.
Swann, J. B.
Thomas, C.
Thomas, R. L.
Tracy, M. S.
Turner, Alex
Turner, L. H.
Van Tine, H. C.

Long, R. M.
Lynn, Samuel
Macoubray, R. J.
Madden, Wm. E.
Warnock, H. R.
Weisbrod, J. F.
Winneal, W. W.
Winlo, R. C.

VISITORS.

Budding, Wm. D.
Coates, H. T., Jr.
Darby, R. F.
Ferguson, O. G.
Henry, J. B.
Holt, R. E.
Kilpatrick, Wm.
Layng, F. R.
Michel, Wm. J.
Miller, Geo.
McDonnell, F. V.
Nichols, T. A.
Nickel, J. K.
Peck, C. D.
Schmidt, Walter
Schnatterbeck, B. E.
Shuck, Wm. C.
Smith, Jno. B.
Smith, S. B.
Stayman, D. F.
Thompson, G. S.
Walsh, W. F.
Weimer, Wm.
Wilson, W. J.
Wood, W. A.

President: The minutes of the last meeting having been printed and distributed, the reading of them may be dispensed with.

Secretary Conway read the following proposals for membership:

C. R. Bell, Foreman Air Brake Shop, Pennsylvania R. R. Co., Altoona, Pa.

W. A. Bostwick, Metallurgical Engineer, Carnegie Steel Co., Pittsburgh.

Thos. Brand, Train Master, Montour R. R. Co., Coraopolis, Pa.

H. B. Brown, Master Mechanic, Erie R. R. Co., Cleveland, O.

Dwight Carson, Supt. Dining Car Dept., Wabash R. R. Co., Detroit, Mich.

W. Cottrell, Foreman Car Repairs, Erie R. R. Co., Wilson Ave., Cleveland, O.

G. L. Davis, Foreman Car Dept., Wabash-Pittsburgh Terminal Ry. Co., Carnegie, Pa.

E. R. DeGrain, Motive Power Inspector, B. & O. R. R. Co., Mt. Clare, Baltimore, Md.

Wm. Fenwick, General Foreman Car Department, Wabash-Pittsburg Terminal Ry. Co., Canton, O.

Jas. J. Flannery, President, Flannery Bolt Co., Schmidt Building, Pittsburgh, Pa.

C. B. Gorsuch, Train Master, B. & O. R. R. Co., Pittsburgh, Pa.

H. P. Grewe, Foreman Locomotive Department, Wabash-Pittsburgh Terminal Ry. Co., Carnegie, Pa.

B. J. Hamm, Car Distributor, B. & O. R. R. Co., Pittsburgh, Pa.

John Haynes, Foreman Machine Shop, Pittsburgh Coal Co., Coraopolis, Pa.

Jas. Horner, Foreman Car Repairs, Pittsburgh Coal Co., Coraopolis, Pa.

W. C. Melson, Foreman Forging Department, Pittsburgh Coal Co., Coraopolis, Pa.

Wm. J. Michel, Rep., National Lead & Oil Co., of Penna., Pittsburgh, Pa.

C. S. Morse, M. C. B., Wheeling & Lake Erie R. R. Co. and Wabash-Pittsburgh Terminal Ry. Co., Toledo, O.

E. McLean, Supt. Wheel Foundry, Pennsylvania R. R. Co., Altoona, Pa.

F. J. Reeve, General Foreman, Pittsburgh Coal Co., Coraopolis, Pa.

Walter B. Whitworth, Manager Pittsburgh Department, Columbia Refining Company, 127 Water St., Pittsburgh, Pa.

W. A. Wood, Rep., Pittsburgh Plate Glass Co., Pittsburgh, Pa.

I. K. Campbell, of the Colonial Steel Co., 5485 Hays St., Pittsburgh, Pa.

D. G. Hood, Frt. Agt. P. & L. E. R. R. Co., Pittsburgh, Pa.

G. S. Thompson, Rep., Ewald Iron Co., St. Louis, Mo.

Julius Krause, Fore. Car Inspr. P. R. R. Co., Pitcairn, Pa.

President: These names have not as yet been passed upon by the Executive Committee. As soon as they have been favorably passed upon, the gentlemen will become members of the Club.

The report of the Committee appointed last March on Methods of Terminal Car Cleaning submitted its report, consideration of which was postponed until after the regular paper of the evening. (See back of Journal for report in full.)

Secretary Conway read the following message:

WORLD'S FAIR, ST. LOUIS, Mo., Sept. 13.

L. H. Turner:

Date for meeting of railway clubs at the exposition has been definitely fixed, Sept. 27th. Please notify all your members and endeavor to get large attendance for a splendid time.

WILLARD A. SMITH.

President: This is the result of the efforts of Mr. Smith to have a Railroad Club Day at the Exposition. This invitation has gone all over the country and each Club is requested to have as large an attendance as possible. All members are requested to report at the Transportation Building as soon as arriving, and participate in the arrangements that have been made for the day.

Mr. J. D. McIlwain: Mr. President, there appears to be some objectional features in our method of electing officers. Our present plan is a good one so far as it goes, but it don't go far enough. Under the present plan not over 30% of the votes of the Club are cast, which, to say the least, is not very flattering to the officers elected. In order to overcome this, I think a part of the method used by the Master Car Builders' Association might be adopted by this Club, therefore, I wish to offer the following resolution:

"That a Nominating Committee of three members in good standing be appointed, they to retire at once and select two or more names of members in good standing for each of the offices of President, Vice President, Secretary and Treasurer and six or more for the Executive Committee. The Nominating Committee to report before the close of the meeting and the names to be balloted on in the regular way."

President: You do not state how this Committee is to be appointed, whether by the Chair or by the Club.

Mr. J. D. McIlwain: By the Chair, always, when not otherwise specified.

The motion, being duly seconded, was put to vote and carried.

Mr. D. J. Redding: Does that take effect at this meeting? If I remember aright, the rules require that any change of the Constitution shall be made by giving notice at one meeting and taking action on it at the next.

President: This is not a change in the Constitution. In the past voting slips have been sent out to the different members. Many of them not being residents of Pittsburgh, hardly knowing who the officers are or whom they want, simply sign their voting slips and return them to the Secretary to fill out. That is not a fair election. What we want is a vote from every member. These slips will have two or three nominations for each office, and thus we will have a full vote and each member will know whom he is voting for.

Mr. A. W. Slocum: I move that the Committee be constituted of the Chair, the Secretary and Mr. McIlwain.

President: That is not fair. We want a committee from the members that are not holding office. Will some one suggest other nominations for membership on this Committee?

The names of Mr. S. C. Mason, Mr. D. J. Redding and Mr. H. W. Watts being suggested,

ON MOTION these gentlemen constituted the Nominating Committee and were requested by the President to prepare and submit their report at the close of this meeting.

President: The paper for this evening is on the subject of Steel Castings, and was prepared by Mr. W. A. Herron, president of the Duquesne Steel Foundry Co. Mr. Herron being unable to be present tonight, the paper will be presented by Mr. Frank, secretary of the Company. I have great pleasure in introducing Mr Frank.

Mr. Laurence W. Frank with the following introductory read the paper, "Steel Castings":

Today, the name Pittsburgh, is synonymous of iron and steel, for in these commodities, the city's reputation is world wide. With our fuel and a myriad of other industrial superlatives, the supply of which are so necessary in the evolution of human progress, we rank deservedly, amongst the world's greatest manufacturing cities. Our advance along these lines has been constant. Looking backward to 1792, we find George Anshutz erecting the first iron works in Allegheny county. It was an exceedingly small affair, consisting of a little furnace devoted mainly to casting stoves, and it requires no great stretch of imagination to share with this pioneer, the great disappointment that he felt when the enterprise was abandoned in 1794, scarcely two years after the beginning of his venture. Its location was what is now Shadyside Station, on the Pennsylvania Railroad. Red shale in the nearby hills had been mistaken for iron ore, and the cost of bringing ore from a distance precluded the possibility of making it a successful commercial proposition. Here was one of the early transportation problems! However, ambition to succeed in iron manufacturing was not to be quelled by this failure, and a few years later (in 1805), we find Joseph McClurg erecting the first iron foundry in Pittsburg proper, at the corner of Smithfield street and Fifth Avenue, where the Park Building now stands. We can well be proud of this institution, which had a long and useful career, for during the War of 1812, it furnished cannon, howitzers, shells and balls for the American forces and Commodore Perry and General Jackson were supplied in part by this foundry. It is perhaps not a matter of general knowledge that the construction of the first rolling mill in this city was begun in 1811, and it began operation the following year. Christopher Cowan was the owner, and its site, at the corner of Penn Avenue and Cecil Alley, is now covered by the buildings of the Joseph Horne Company. It is not the purpose of this paper to recite the early history of the iron and steel industry (a theme that must have the greatest attraction for those familiar with its stupendous expansion), but in considering steel castings, it does not seem amiss that mention of the pioneers in our vicinity be made, for the modern steel foundry and its products are but latter day developments of the iron and steel and foundry crafts.

STEEL CASTINGS.

BY W. A. HERRON, PRESIDENT DUQUESNE STEEL FOUNDRY CO.

In all departments of engineering activity the trend of the times is strongly in the direction of increased power and strength, that greater loads may be drawn, heavier burdens carried, higher speeds attained and increased output secured, all for the purpose of saving time, or lessening the cost of production or transportation. To secure the necessary increase in strength to resist the growing strains of service without at the same time unduly increasing the size and weight of the parts, the engineer has substituted steel for iron castings, and this substitution is going on in all directions wherever a combination of lightness and strength is deemed essential.

The effect of this substitution is more apparent when we consider that the tensile strength of cast steel is from three to four times as great as good cast iron. And this is not the only advantage possessed by the steel, for cast iron is more or less brittle and offers but feeble resistance to fracture from shocks, while steel, particularly if properly annealed, offers great resistance to failure from that cause.

There are several processes in use for making cast steel, namely, the CRUCIBLE, the BESSEMER and the OPEN HEARTH. The oldest of these is the

CRUCIBLE PROCESS,

which, for more than one hundred and fifty years, has continued in use with little variation in the methods employed. As its name implies, the metal is melted in pots, or crucibles, made of fire clay or plumbago and holding one hundred pounds or less. These pots are placed in melting holes, or chambers, about three feet deep and two feet square, lined with fire brick. The tops of the chambers are about level with the floor of the casting room, and they are covered with iron lids, also lined with fire brick. Several of these chambers are placed in a line, each communicating by means of a flue with a single stack which serves them all. The pots are put in the holes by means of tongs and are removed in the same way. When coke is used as fuel it is piled all around the crucible up to the top, which is covered with a lid made of the same substance as the crucible. In this country the usual fuel is producer, or natural gas, instead of coke, and in that case the furnace is supplied with checkerwork below to heat the gas and air, as in the open hearth furnace. Various mixtures are used in the crucibles to produce steels of desired qualities. For highest grades blister steel, or steel made of Swedish iron bars heated to redness in a bed of charcoal, is melted in the crucible; or Swedish iron bars may be melted and brought to the required temper by putting charcoal in the pot; or blister steel may be melted with mild steel scrap; or broken pig iron of pure quality may be melted with Swedish iron. The latter is the usual practice in the foundry. In this country very little, if any, Swedish iron is now used in the manufacture of Crucible Steel, it having been replaced by a pure wrought iron of domestic make.

When the metal has been melted Ferro-manganese, or Spiegeleisen, is added to give the steel the desired composition, and it is then poured into the casting molds.

It will be apparent that steel made by this process is best adapted to the manufacture of small castings, but the product of many pots may be mixed in a ladle, and castings of large size have been made in this way.

BESSEMER PROCESS.

The Bessemer process, invented by Sir Henry Bessemer nearly fifty years ago, consists of blowing air through molten iron for the purpose of oxidizing and eliminating the carbon, silicon and manganese that it contains, and when that has been done Ferro-manganese, or Spiegeleisen, is added to restore to the metal the desired quantities of the constituents so removed. The operation as applied to a foundry is as follows: The mixture of pig iron and scrap is melted in a cupola, from which it is drawn off into a ladle and carried to the converter into which it is emptied. The converter is a pear-shaped metal vessel lined with some highly refractory substance, such as gannister or fire brick, open only at the top or small end and supported on trunnions so that it can be tipped for the purpose of charging and discharging the metal. One of these trunnions is hollow, and through it air is blown at a considerable pressure into a blast box attached to the bottom of the converter, from which the air passes through small tuyeres into the body of the converter and thus through the molten metal, escaping out of the opening at the top. When the flame drops, the silicon, manganese and carbon have been burned out and it is only necessary to add the proper amount of Ferro-manganese, if mild steel is required, or Spiegeleisen, if steel of higher carbon is wanted, when the steel is ready to be run out into a ladle and carried to the molds.

In the large works where rails and similar products are made, the molten metal comes directly from the blast furnace to an intermediate vessel called a "MIXER," capable of holding sometimes as much as six hundred tons. The object of this mixer is to secure uniformity in the composition of the metal, which may come from several different furnaces. So that whether a blast furnace be working well or poorly the metal going into the converter is kept reasonably uniform in quality because of the large number of furnace heats that the mixer contains. From the mixer the metal is taken to the converter.

This process is now but little used in the manufacture of steel castings, having been superceded by the open hearth process, on account of the superior quality and greater uniformity of the steel made by the latter. For small castings, however, a modified Bessemer process, such as the Tropenas, is sometimes used. The Tropenas converter is usually of about two tons' capacity, so that small heats may be made.

ACID OPEN HEARTH PROCESS.

In this process, invented by Sir William Siemens and first put into successful operation about 1868, the metal, consisting of pig iron and steel scrap, is melted on the bottom, or hearth, of the furnace without contact with any solid fuel. The furnace, which is rectangular in shape, is constructed of structural shapes and plates firmly bound together by means of tie rods and lined with a highly refractory silica brick. The bottom, or hearth, is covered with very pure silica sand. Underneath the furnace proper are four large chambers, two at either end, called regenerators, which are filled with fire brick laid loosely in rows with an air space between each two rows, and each course is laid at right angles to the course below, forming checkerwork. Two of these regenerators, one at either end of the furnace, are for air and the other two for gas. The usual fuel is producer gas, but in this district natural gas is much used. When producer gas is used the gas passes through a pipe, or flue, from the producers to the bottom of the gas regenerator at one end of the furnace and up through the checkerwork, through ports, into the furnace, where it mingles with the air coming up through the air regenerator, and combustion then takes place. The products of this combustion pass out of the furnace through the ports at the other end, into the regenerators and thence to the furnace stack. The checkerwork is thus heated to a great heat and it in turn heats the air and gas as they enter the furnace when the flow is reversed, as it is every fifteen or twenty minutes. When natural gas is used it enters at the ends of the furnace proper, where it mingles with the heated air coming through the ports, and all four regenerators are used for air. By this method sufficient heat is generated to oxidize the silicon, manganese and carbon, and when that has been effected Ferro-silicon and Ferro-manganese are added. Pig iron is sometimes added to increase the carbon, or ore to reduce it, as the tests may show to be necessary.

In all of these processes the phosphorus and sulphur are not affected, and the materials used should contain somewhat less of these elements than is desired in the steel.

IN THE BASIC OPEN HEARTH PROCESS

the furnace is practically identical with the acid furnace except that in the basic the bottom is made of a neutral material called dolomite, a compound of lime and magnesia, and the brick lining to a point above the bath is made of the same material, or magnesite. Lime additions are made to the furnace during the working of the charge to reduce the phosphorus in the metal, forming phosphate of lime, which is carried off in the slag. Sulphur is reduced somewhat by the manganese in this process, but the results are variable and it is best to use metals low in that element. The basic furnace is used largely in steel works making rolled steel products because cheaper materials can be used, and to some extent in foundries, but owing to its greater tendency to "wildness" and consequent sponginess of the steel, the acid furnace is the one in general use in steel foundries.

LADLE.

When the tap hole of the open hearth furnace is opened to withdraw the charge it cannot be closed again as is possible in iron practice, until all of the steel is run out, because the steel comes out so quickly and in such volume that it is impossible to stop it. It is necessary, therefore, that the ladle be large enough to hold the entire furnace charge. The ladle used in the steel foundry is a bottom pouring one, because many small molds must be filled, and it would be impracticable to do this with a ladle holding from fifteen to twenty-five tons by pouring over the lip. Another reason is that the slag, being lighter than the metal, floats on top and only the clean metal runs into the mold through the nozzle at the bottom of the ladle.

DRY SAND CASTINGS.

On account of the high temperature of the molten steel as it is run into the mold, the latter must be made of a very refractory material. The material used is a pure silica sand which is mixed in the sand mill with fire clay and molasses water to give it a bond. This mixture is used for the face of the mold, i. e., the part that comes in contact with the casting, and back of this facing, "heap" sand, or sand from old molds is rammed. After the mold has been completed it is coated with a wash consisting of ground flint, molasses and water, to give the casting a good surface. It is then taken to the oven and thoroughly dried. From the oven it goes to the casting floor, where the cores are set, the molds closed, and the metal poured. The baking of the mold makes it very hard, and great care must be exercised to prevent the casting from checking, even if the composition of the steel be good, particularly in the case of castings having thin sections, or when, by reason of the design, strains are likely to be created due to unequal cooling. Several precautions may be taken to prevent checking, among which are the cutting of thin slits at the proper places in the mold into which the steel runs, forming brackets which set quickly and strengthen the casting while it is cooling; the placing of iron rods in those places in the mold where strains will come in cooling; the cutting away of sand in the mold and the filling of the space so formed with cinders or sawdust, so that the mold will yield when the metal is contracting around it; the filling of the center of large cores with cinders or sawdust to soften them; the chilling of the steel by coming into contact with metal chills inserted into the mold, or with nails driven plentifully into the mold for the same purpose; the designing of the casting in such a way as to, as far as practicable, avoid undue variation in the thickness of the section of its different parts. Sometimes water is run through large cores, holes being left for the purpose, to cool the inside of the casting at the same time as the outside. In order to insure sound castings a sufficient number of feeding heads of good size should be used to permit the gases formed in the mold to escape and keep the mold full as the metal settles in cooling. In some cases it is well to tip the mold i. e., to raise one end higher than the other to force the gas out at the top as the metal rises from the lower end, where it enters, and to insure the mold running full of metal.

After the casting is shaken out of the mold it goes to the cleaning room, where the sink heads or grates are cut or broken off. The sand adhering to the casting is then removed; the casting is trimmed and ground and is ready for shipment. If it is to be used in a railroad car, or locomotive, or bridge, or some other place where it will be subjected to great strains or shocks, it should be thoroughly annealed to eliminate internal strains and to increase its ductility. If resistance to wear be the quality desired in the steal, annealing will not improve, but more likely injure it.

GREEN SAND CASTINGS.

Small steel castings and castings of light sections are sometimes made in "green" molds, i. e., in molds that are not baked. This method has the advantage of being somewhat cheaper, and because the molds are soft and yielding, internal strains are not so likely to be created, as in the harder, dry molds, but castings so made are not so free from blowholes as those made in the dried molds, and are therefore not so satisfactory, particularly if they are to be machined, as the finishing process discloses the defects not otherwise apparent.

INSPECTION.

The inspection of steel castings as at present practiced leaves much to be desired. One inspector, using discretion, may accept a casting having slight external defects marring its appearance somewhat, perhaps, but impairing its serviceability but slightly, if at all. Another, inspecting the same casting, fearing the criticism of his superior, will insist upon perfection and reject the casting. In one instance in the experience of the writer, a railroad inspector rejected a lot of castings for external defects, in most cases scarcely discernable with the naked eye. An appeal was taken to his superior, who made a careful personal inspection of the castings and accepted practically all of them. In another instance, a lot of bridge castings were accepted at the makers' works by the representative of an inspecting company, and, subsequently, a number of them were rejected at destination by another representative of the same company. The bridge company would have accepted the rejected castings, but the engineer of the railroad company would not receive them. There were thus four diffrent inspections made, with alternate acceptances and rejections.

No reputable manufacturer will object to any reasonable inspection, but when a casting is once accepted it should not subsequently be rejected unless for defects developed during the process of finishing, and which render the casting unsafe to use.

CO-OPERATION.

It is to the mutual advantage of the manufacturer and his customer that castings shall be furnished of a grade best suited to the use to which they are to be put, and to that end there should be earnest co-operation. If the manufacturer be informed as to the requirements in any case he may make the steel a little softer or a little harder than the average, to suit the special conditions existing, and he will know whether or not the casting should be annealed. If he know where the strains of service are to come, he will be able to take especial precautions to have the vital point of the casting solid In some instances castings must be turned out so close to given sizes that a little too much rapping of the pattern in the mold will entail extra expense for machining, or perhaps cause the rejection of the casting if it must fit in place without machining. If the founder be cautioned as to the requirements in such cases he can perhaps avoid the difficulty, or, with a little chipping and the use of rough gauges, correct it and thus prevent complaints and dissatisfaction on the part of the customer. If every pattern sent to the foundry were plainly marked so as to show what parts of the casting are to be machined it would be a guide to the foundryman, who can take precautions accordingly. An occasional visit of the buyer to the foundry and of the manufacturer to his customer's works should result in good to both through the familiarity each would gain of the other's work and methods.

FAILURES.

Everyone should profit by his failures. So when a casting fails in important service the cause of failure should, if possible, be ascertained. If it be due to any weakness of the casting it should be known so that a stronger one may replace it, or perhaps the design may be improved. The broken parts should be preserved so that the maker as well as the user may make such tests as he may desire. When defects develop in the process of finishing which cause the rejection of a casting, the manufacturer should have the casting returned for inspection before a new one is made, or if this be impracticable because of insufficient time, a sketch showing the location and nature of the defects should be furnished him, in order that he may avoid a repetition of the trouble in making the new casting. As an aid to such investigations all important castings should bear the manufacturer's mark for the purpose of identification. In cases where the foundry stamp or mark is obliterated in the process of finishing the castings should be restamped in the shop.

As a result of unpleasant and costly experiences with steel castings in locomotives some very intelligent and experienced railroad mechanics had reached the conclusion that some better material was imperatively needed as a substitute for steel castings, particularly for frames and wheel centers. If the cause of failure had been ascertained in each such case it would doubtless have been shown that if the material was not bad, the castings were of poor design, or they had not been treated in the foundry in such a manner as to give the best results.

QUALITY AND COST.

The buyer of steel castings who changes with every wind, now buying from one foundry and then from another, looking always for the lowest price, is not the one who may expect the best of service. Co-operation in such a case is impracticable. The expectation of a continuance of patronage is the incentive needed by the manufacturer to excite him to his best endeavors. Familiarity with his customer's requirements enables him to better supply that customer's wants, and such knowledge comes through length of service. In such important service as in locomotives and cars, where a broken part may cause loss of property and endanger human lives, the first consideration should be safety and the constant endeavor should be to secure not the cheapest, but the best.

SUBSTITUTION OF CAST STEEL FOR MALLEABLE AND WROUGHT IRON.

A generation ago when a railroad freight car weighing no more than seven or eight tons, carried a load of ten tons at a speed of ten miles per hour; when a freight locomotive without its tender weighed but thirty tons, cast iron was considered strong enough for many parts of railroad equipment. But the rapid growth of traffic due to the country's development, the necessity for economy in operation to offset the gradual and constant reduction in freight charges and the higher speeds made possible by the introduction of the automatic coupler and the air brake, brought into service heavier cars and engines and rendered necessary the use of stronger materials in their construction; and cast iron gave way to malleable iron, with a gain in strength of one hundred per cent. The development of railroad equipment has gone on at an accelerating pace, until now we have freight cars weighing twenty tons, carrying a load of fifty tons, and locomotives weighing without tenders more than one hundred tons. Malleable iron is not suited to such service, and cast steel, which is from 50 to 100 per cent stronger, is rapidly taking its place. The Master Car Builders Association has adopted as standard the cast steel draw bar and malleable draw bars will not likely any longer be used. Bolsters and center plates are now generally made of cast steel.

In the construction of locomotives, except those of small size, or ones intended for yard service, practically none other than steel castings are now used.

And cast steel has displaced not only cast and malleable iron in important service, but the tendency is also towards its substitution for forgings. The committee of the Master Mechanic's Association that recommended at the recent meeting at Saratoga the adoption of the cast steel locomotive frame rather than the forged frame was alive to the fact that cast steel made of good materials and properly annealed, is the strongest and cheapest material that can be used in the construction of locomotives, and since the report of that committee was made, the prejudices against cast steel that had existed through misunderstandings in some minds has been visibly reduced, if not entirely eradicated.

The reasons given by the committee for their recommendation are as follows:

> "The tensile strength of the steel, suitable for frames, is about 75,000 pounds per square inch, as compared with 53,000 to 54,000 pounds per square inch for the best hammered iron.
>
> "The cast steel frame is practically homogeneous, that is to say, there are no welds, and it is of a uniform texture throughout its entire length.
>
> "The number of projections required for the reception of brake work, tumbling shafts, rocker pins, etc., seriously complicates the production of modern

> frames in hammered iron, whereas the reverse is true in the manufacture of cast steel frames.
>
> "Generally speaking, steel is intrinsically superior to wrought iron, and all the difficulties experienced with cast steel are mainly chargeable to either design or method of manufacture and not to the steel per se."

To which should be added the further reason that a considerable saving in the cost of locomotive frames may be effected by the substitution of cast steel for wrought iron.

President: Gentlemen, The interest of our meetings is maintained, not only by having good papers, but by having good discussions. Steel castings has its friends—and then there are others. And we ought to have a good discussion of this paper tonight. It is a good one and was well presented.

I would ask Mr. A. W. McCaslin to open the discussion.

Mr. A. W. McCaslin:, Master Blacksmith P. & L. E. R. R.—Mr. President and Gentlemen:

Since receiving the advance copy of Mr. Herron's paper on the subject of Steel Castings I have made a few notes which, with your permission, I would be pleased to read.

Mr. Herron is to be congratulated on his excellent paper. It contains many points beneficial to us all. It is educative as to the different mixtures and processes in the making of steel and I should feel like apologizing should he understand me from my notes as condemning the steel casting as a whole, or for all purposes, for it certainly has some superior qualities in its proper uses. For most purposes as a substitute for the iron casting it is incomparable, having a tensile and torsional strength from 300 to 400 per cent greater than the iron casting.

The casting of steel into different forms is one of the greatest, and we might say one of the most indispensable, inventions in the production and different uses of metals.

The steel casting is not only superior to the iron casting, but can be used in many places with safety and to great advantage, as far as first cost is concerned, over the ill-shaped or intricate wrought iron forging.

The Pattern Maker and Moulder combined have a much easier and consequently a less expensive way of producing difficult shapes in iron and steel than the blacksmith or forger, the only question being as to the reliability of their product, and were it possible to produce steel castings true to pattern, with a ductility equal to that of wrought iron forgings in recovering from shocks and vibrations, relieved of all strains by annealing, and have all the cavities, large or small, numerous as they are, locate themselves in the neutral axis, where their injurious significance would only be in proportion to their size, we would not only have an ideal metal, but an ideal way of bringing about desired results, in not only lessening the first cost of motive power and equipment, but the maintenance of the same.

If the above necessary qualifications were often combined or met with in the ordinary steel castings of to-day, some of us would think our experience had been with an inferior grade of steel; but not so. The presence of the above requisites are the exception rather than the rule. Steel castings are generally rough and seldom true to pattern, and having a tensile strength in excess of their requirements only adds that much to their liability to fracture from shocks, for it is a recognized fact that great tensile strength in steel is only obtainable by a corresponding depreciation in ductility.

We would not be understood as claiming that most steel castings are not ductile or that they would not give good satisfaction were they placed, as some say, "on the dead quiet," or even given sufficient time to accommodate themselves to applied strains, for we know that many steel castings will stand quite a deflection without fracturing if the load of stress be applied slowly, yet our experience has demonstrated to us that these same steel castings, under shocks or severe vibrations, will not only fracture, but go to pieces.

True, the Committee of Master Mechanics, at their meeting in June last at Saratoga, recommended the cast steel locomotive frame in preference to the wrought iron frame, but that action alone is not conclusive as to the relative merits of the steel casting and the wrought iron forging, neither does it annul the facts that lead others to prefer the wrought iron frame. If the report of the above Committee voiced not only the opinion, but the demonstrated facts in the experience of a majority of all our Master Mechanics, rather than a committee of ten or twelve, we would ask what higher power on many of our railroads have not only discontinued specifying steel frames for their new engines, but are forging wrought iron ends to piece out the broken steel frames with.

The homogeneity claimed for the steel frame, through the absence of welds, is frequently a misnomer after short service, and should we acknowledge the uniformity of texture in the locomotive cast steel frame it would be through the fact that they break quite as readily in the middle as they do at either end.

From what experience I have had with the locomotive cast steel frame I will venture to say that under the sudden shock of the possible head-on collision it would separate at many points, making it irreparable, and prove itself little protection to either boiler or cylinders, while the wrought iron frame, if properly made and subjected to the same abuse, would accommodate itself to the shock of the blow after exerting its full compression strength, which is generally sufficient in such cases, by bending in the front section in front of the cylinders, and the main frame by bending in the middle, allowing a greater part of the effect or energy of the shock to expend itself in what might be termed strain waves, which would pass through and out the other end of the frame, leaving it reparable.

I would like to ask two questions: Did any gentleman present ever see a locomotive wrought iron frame that had actually pulled in two through a lack of tensile strength? Such a separation would show quite a reduction of area in the material at point of breakage, as well as an elongation sufficient to sheer the frame from its fastenings. Have you ever seen a locomotive wrought iron main frame upset or shorten while in service through insufficient compression strength? My object in asking these questions is to strengthen the claim that a material with an extremely high tensile and compression strength is not best for locomotive frames.

The wrought iron frame with a tensile strength of from 50,000 pounds to 54,000 pounds per square inch, having seldom if ever failed through a weakness in tensile strength, would indicate that most breakages occur through insufficient ductility—its most needed virtue—the power to accommodate itself to sudden shocks.

In an extreme case, possibly, the locomotive cast steel frame has shown an average of one breakage for every 600 pounds tensile strength added to the 54,000 pounds claimed for wrought iron until the 75,000 pounds claimed for steel has been reached. This does not mean that these frames broke with a strain of 54,600 pounds. Some may have reached the 75,000 pounds claimed for them; but, while causes other than high tensile strength may have figured in the case, I would say—as the hunter never disregards the barking of the squirrel or the dropping of the acorn—neither should we disregard this case.

As a further illustration of the merits of the locomotive wrought iron frame as compared with the cast steel frame, I cite an instance of one railroad operating about 200 locomotives, all of which have wrought iron frames, and no breakages; while a neighboring railroad operating a lesser number of locomotives, all equipped with cast steel frames, had so many breakages in the steel frames that they were compelled to ask assistance in the way of repairs from the road that were using only the iron frames.

Should the opportunity present itself, I would be pleased to apologize to Mr. J. F. Deems, General Superintendent of Motive Power of the N. Y. C. & H. R. R. R., for quoting him in his remarks at the meeting last March of the N. Y. R. R. Club, on the locomotive cast steel frame. He said he thought he preferred the steel frame owing to the fact that it was difficult to make iron from scrap that would be free from steel, the inference being that if the iron was free from steel it should be preferred to the steel casting. He also said they had five coach truck steel equalizers break recently, and at the point of breakage they were practically all the same, mostly blowholes with a little steel around the holes. We have like evidence from all directions as to the loose character of steel castings.

At this point your attention is called to several specimens of broken steel castings on the Secretary's table. Pieces Nos. 1, 2 and 3 were taken from a broken bottom rail of a locomotive cast steel frame sent to our shop recently by a neighboring railroad for repairs. The dimensions of the broken section were 4x2¾x20 inches, and it had apparently fallen from the frame by its own weight, being nothing, "so to speak," but a mass of cavities, and the wonder was that the frame had not separated in many other places, as it was honeycombed from one end to the other and had been, by some one who evidently did not believe the story of the Bible, filled with Babbits Metal, thus inviting a perefect demonstration of "cause and effect". Piece No. 4 was taken from a broken engine tank steel truck frame I understand that there are six of these steel frames that were placed in service about the same time, and every one of them show breakage from ordinary service. In repairing cast steel frames we find many with large cavities in them filled with lead. You will find a lead filling on the Secretary's table taken from one of them.

I recently witnessed in a railroad machine shop the boring out of four cast steel eccentric straps for high speed engines, and each strap, when the boring was completed, showed many large cavities throughout the groove, and about one week ago I saw four cast steel eccentrics that were planed and drilled and there was not a sound one in this order of four. There were cavities as large as a hulled walnut, beginning in the side of some of the bolt holes and running with the circle of the casting. The full extent of the cavities will not be known until the castings are broken. One would think if the factor of safety allowed the steel castings in general use was determined by what a solid or sound steel casting should be, that there is scarcely a factor of safety in them as they are, and that their proper factor of safety should be decided by the use of an X-ray and a sliding scale. A like compliment at this point might be paid some grades of piled or hammered iron. Frequently piled iron becomes too dry, having been piled and worked so often from the furnace into different shapes that the life is roasted and worked out of it. Such iron will not give good service. It is scarcely better than that piled from badly crystallized scrap. These two vital points are too often disregarded in piling iron for forgings that have to undergo shocks or severe strains.

The life of iron to be made from scrap that has become too dry through service can be renewed if a sufficient amount of scrap from merchant bar iron that has not already spent its life be added, or by adding from 30 per cent to 40 per cent of good muck bar.

The danger of getting steel into hammered iron is mostly in the piling of small miscellaneous scrap. Such scrap should not be used in the making of such an important member of a locomotive as the frame, where a refined long fibre iron is necessary.

In returning to the casting, will say: If steel castings that are sound and in the rough are placed where they will not have shocks to contend with they will generally give satisfaction, but when roughly machined every tool mark left on or in them invites breakage at every such mark.

While this paper refers to the steel casting of to-day, we would welcome in the immediate future, should they be in evidence, steel castings free from strains, cavities, etc., with ductility sufficient to sustain themselves against the ordinary shocks in the ordinary daily service of locomotive, coaches and freight cars—something we could wager our surplus money on with some show of winning.

President: Now we would like to hear from the steel manufacturers as to how these little troubles Mr. McCaslin has mentioned can be avoided, as no doubt they can be.

Mr. H. B. Ayers:, Supt. Pgh. Works, Am. Loco. Co.—With the introduction of steel castings in locomotive construction, it has been possible to reduce the weight of a great many of the detail parts very materially, thereby allowing the application of a larger boiler with a larger steam capacity. This has without doubt produced a locomotive which has given the railroads far better service than the old locomotive, weighted down with cast iron.

There is little question about the efficiency of steel castings for driving boxes, tender, draw castings and the like, and in fact, foot plates, except, perhaps, on six-wheel switchers, where the additional weight is necessary on the back end to make a good equalization of weight; also in reverse shafts, rockers, equalizers and frame pilings, brake work, etc.

Perhaps the two castings which have given the most field for discussion are cast steel driving wheel centers and frames. With a properly designed cast steel center, rightly gated, it does not seem to me that we need the slotted rim; and with that one point thrown out, I think we will all agree that the cast steel center is the proper center for passenger work and a great deal of freight service.

Regarding cast steel frames, I will say that up to perhaps two years ago, I was not at all in favor of the cast steel frame, from a builder's standpoint, to say the least. I cannot exactly agree with the last paragraph in the paper tonight. When we take into account the fact that almost every steel frame has to go to the blacksmith shop to be straightened before we can put it on the planer, and that even after the frame is on the slotter or on the drill press, we sometimes find defects which are sufficient to send the frame back to the blacksmith shop or condemn it as a whole; we can afford to pay a higher initial price for wrought iron frames. In the last two years we have had comparatively few condemnations of frames.

Today on reading over the paper, I thought of some tests which I made for my own information a little over a year ago, comparing some steel and wrought iron frames. I will read you the results which I found. The results were gotten in this way: Twelve steel frames were taken, upon which the test pieces were just about double the length of the ordinary test pieces. Before the frame was put in the annealing furnace I had one-half of the test pieces broken off; the other halves went into the annealing furnace and were annealed with the frames. As a result, and this is the average result of the twelve tests in each case, the hammered iron frame showed us an elongation of 33%, the annealed steel an average of 24%, and the un-annealed 12½%. The un-annealed steel frame showed about one-half as much elongation as the annealed frame showed. The reduction of area was in the proportion of 41, 34 and 12. Strain per square inch in the hammered iron showed 50,980; annealed steel, 71,970, and un-annealed steel 67,700. The test showed one thing very clearly, that we should insist on a thorough annealing, for by so doing our tensile strength per square inch is increased 6 3-10%, and the elongation practically doubled.

President: Are there any other gentlemen who would like to speak?

Mr. J. P. Allen:, Union Steel Casting Co.—Mr. Chairman: I should like to say a few words, particularly in reply to some of the points brought out by Mr. McCaslin in his remarks in regard to steel castings. One in particular, in regard to high tensile strength being secured in cast steel at a corresponding loss of elongation and reduction of area. Now, it is true, that was some years ago accepted as the way the thing worked, and it did work that way to some extent. But the steel foundries and steel manufacturers have been improving their product as they went along, and today they are turning out a vastly superior grade of steel in their steel castings than was the case in the earlier manufacture of steel frames, particularly. Today they are melting a uniformly far better grade of melting stock in making their castings, and the best grade of low phosphorous basic material goes into the acid furnace for melting the steel. The matter of annealing has been given a great deal of study and attention, and where it used to be something of a hit or miss proposition, now when we put castings into the annealing pit we know just what we are doing, and we know that a certain degree of temperature will affect the castings as we desire to do. And we now produce steel of from 65 to 75,000 pounds tensile strength per square inch, and obtain very readily an elongation of from 20 to 30% and a reduction of area running up frequently to as much as 40 to 50%. of which material a bar can be bent so that the two ends will meet, and, in fact, put in a vise and hammered with hammer blows and bent together under shock—which shows that the metal is tough and ductile as well as having a high tensile strength.

Mr. McCaslin spoke of forging wrought iron ends to steel frames which have broken. Now, we are to-day making in our shop cast steel ends to replace ends of broken wrought iron frames on one of the very large western roads, and a road which is very careful in its selection of material and whose inspection is very severe.

Another thing. Mr. McCaslin spoke of the recommendation of steel frames by the Committee at the Convention at Saratoga, being the opinion of but ten or twelve master mechanics. I had the pleasure and honor, as the representative of my company, of attending one or two of the meetings of that Committee, one in New York and one in Philadelphia, on invitation of the Committee, together with a number of other steel casting manufacturers. And before making that recommendation the members of that committee, who were certainly among the brightest men in the railroad world, sent circular letters to all the principal roads in the United States and secured their opinion on the wrought iron and cast steel frame. They asked them to advise whether they were using wrought iron or steel or both, and which they preferred and the percentage of breakages, and all that; and they passed around at the meeting blue prints and graphic charts showing a summary of these replies. The preponderance of opinion was so strongly in favor of cast steel frames, from I don't know how many dozen roads, that there seemed to be no question about it. And further, in comparing the amount of locomotive equipment, it was much more marked than it was from the number of individual railroads.

For instance, the larger systems and those using a great many locomotives, seem to almost all of them favor the cast steel frame, and by far the majority of those who are using both cast steel and wrought iron frames. As I remember it, there were only two who were using both, that spoke in favor of the wrought iron frame, and there were a great many using both that spoke for the steel frame.

Mr. McCaslin cited the defects of certain steel castings, and we are free to admit that we cannot make them all without some defects. But the castings that are made today are infinitely superior in every way to those that were made in the early days of the steel casting business. In the case of engine frames, when they first went to manufacturing them, I had an opportunity to observe closely, and I have been in touch with the manufacture of steel frames ever since they commenced to make them, and I know that in a great many of those that were first made, the question of design was little considered with especial relation to casting of steel. But years of use of steel frames have brought about many changes in the design and in the making that have tended to produce a much better frame. A great many frames were put in service in this country that were not annealed, and certainly if any casting ought to be annealed it is a locomotive frame. There is no doubt on the score that steel frames as now made are very much superior to any that were made some years ago.

Mr. McCaslin, after reciting the difficulties regarding steel frames and the difficulty of knowing that they are free from defects, expressed the opinion that a hammered iron frame was superior, if proper material went into it, and it just seemed to me that there were about as many "ifs" and "ands", if not more, in regard to getting the right proposition in wrought iron frames as steel frames. And I would like to ask Mr. McCaslin how he is going to make sure in every case that this ideal condition has been secured when he makes up his wrought iron frame.

I heard the opinion expressed by one of the leading locomotive manufacturers in this country, located in the east,, that they were putting cast steel frames into 85% of the locomotives which they were building, and that, in his opinion, the worst cast steel frames he gets are better than the best iron. And he further said, that he considered that there was more reason to anneal a wrought iron frame than a steel frame; that a wrought iron frame was unequally heated, in making welds it was heated in one place and hammered, and then heated in another, and different parts of the frame adjacent to the welds take a different temperature from other parts of the frame; that there are thus great strains thrown into the wrought iron frame which are never removed by annealing as they are from the steel frame when it has been annealed thoroughly, and as has been demonstrated in actual tests.

President: Mr. McCaslin will answer the questions.

Mr. McCaslin: Mr. Allen dwells on what he supposes to be a fact, that if the steel frame is annealed, it is just what it should be. Suppose that steel frame is full of cavities and blow holes. Would the annealing remedy that?

Mr. Allen: No, sir. But as they are made today we are very sure they are not full of holes.

Mr. McCaslin: I might say that we have a piece of a locomotive cast steel frame on the Secretary's table, not old enough to be weaned, and it is full of holes, and plainly shows its lack of maturity.

A Member: How old is that?

Mr. McCaslin: About eighteen months in our country.

And as to the proper making of wrought iron frames, it is only necessary to use the proper scrap—in other words, force another dollar into your frames instead of trying to reduce its cost. That is the trouble with frames today, as I understand it. There is no trouble in getting good wrought iron frames if they use good scrap. I think my paper anticipated and pretty well covers the remarks by Mr. Allen.

Mr. A. Stucki: I fully agree with Mr. Allen in regard to the importance of the proper annealing of steel castings, and by this I not only mean locomotive frames, but car and other castings as well. I have seen specimens taken from the same heat so as to have practically the same chemical composition, some were annealed and some were not. The result was a decided difference in the structure of the respective samples, in fact, so much so, that onycne would have taken them to be two entirely different metals. The original casting showed a coarse crystalline structure, while the annealed casting had a fine silky structure, very similar to that of rolled steel of the same composition.

In order to obtain the desired change in the structure, it is necessary to heat the metal to the critical point, about 750 degrees Centigrade or 1300 degrees Fahrenheit. Below this temperature such a change will not take place and castings annealed in this way will still show the original crystalline structure. Proper annealing with steel castings is just as essential as with malleable iron and the difference in structure is just as marked.

In regard to the internal strains, Mr. Herron mentioned in his paper, I am convinced, that they are very great at times. Several years ago I saw a spoke of a driving wheel center, which pulled away from the rim, leaving a gap of not less than ¼ inch. But the method of making steel castings has of late been improved in such a way that the material of today is entirely different from what we used to get ten or fifteen years ago. It often reminded me of Swiss cheese—more hole than cheese.

Speaking about inspection, I notice that Mr. Herron thinks that a steel casting once accepted, should stand accepted. Gentlemen: I have seen castings, which have passed two and more experienced inspectors, and were finally found to be defective and worthless. At the time it was almost impossible to find these defects, as the castings were finished up and painted, and had the castings been inspected in the rough, freight both ways and a good deal of valuable time would have been saved; therefore, I believe that no steel casting should be painted until it has been inspected by the proper party, neither should the acceptance of the first inspector relieve the manufacturer of his responsibility, should defects (not trivial) come to light in working on the castings or otherwise.

President: Mr. Frank will you close the discussion?

Mr. L. W. Frank: I believe if we have learned nothing else tonight, that we have learned that the annealing of steel castings is of great importance. We know that annealing means the re-arrangement of the entire crystallization. There was a time when specifications came to us reading "Castings must be annealed to a cherry red". We know that there are many shades of red in a cherry, that some of them may border almost upon a black and vary from that to almost a bright yellow, so that a "cherry red annealing" meant a go-as-you-please-operation. But we do know today that it requires 1300 degrees Fahrenheit to affect the steel and before there is any re-arrangement of its crystallization, and we know, too, that when the heat exceeds a certain point, that steel castings are not benefited. So that today we rely upon our pyrometers, and in our own works, the register, showing the temperature in our annealing ovens, is located in our office under lock and key, and no department of the business is more carefully watched than this, because we recognize annealing to be a most important factor and essential to the production of first class steel castings, that are subject to continuous jar or sudden shocks. The gentlemen have referred tonight to the quality of steel castings. There is not very much guess work here, if proper melting stock is used, and I believe it is the custom of manufacturers of acid open hearth steel castings today, generally speaking, to specify, when their metal is purchased, phosphorus not to exceed .04, and as a result, our steel castings will seldom exceed .03 sulphur and .04 phosphorus. And in conclusion, when a manufacturer finds a cast steel locomotive frame porous and endeavors to fill it, he is a criminal and he ought to be locked up for a very serious offense, because he has very little regard for human life or property when he is guilty of such an act. I do not claim for the steel castings people that they are angels, but I do not believe any reputable manufacturer of today would be guilty of such practice. It is wrong.

President: Gentlemen, one of our members has been honored by election to the presidency of the Master Car and Locomotive Painters' Association, Mr. John Lanfersiek, foreman of painters of the Pennsylvania Lines West of Pittsburg. You all want to know him and we would be glad to hear from him.

Mr. John F. Lanfersiek: Mr. President and Gentlemen of the Railway Club of Pittsburgh: I do not know that I can say anything of importance to you this evening. I will say, however, that I have been a member of this Club for more than a year, and I am sorry to be compelled to confess that I have been somewhat derelict in my duties to the Club in attendance on its meetings. I was present at the last meeting in May and there was a large attendance, and the information gained by the paper read and discussed at that meeting induced me to come to this one. I must say, I am glad I am here tonight. I hope that I may be present at many of our future meetings. I thank you.

Mr. F. T. Hyndman: I move a vote of thanks be extended to the gentlemen who presented this very able paper here this evening and who participated in its discussion.

The motion being duly seconded was put to vote and carried, and the thanks of the Club duly tendered the gentlemen.

Secretary Conway reported and presented to the meeting his report of the Convention of Railway Club Secretaries, held at Saratoga, last summer, and the Chair ordered, with common consent, that this report, together with the report of the Committee appointed last May on Best Methods of Terminal Car Cleaning, be printed in the proceedings of this meeting, and that their reading at this time be dispensed with because of the lateness of the hour.

Mr. Stephen C. Mason: Your Committee on Nominations have the honor to report the following nominations:

For President—L. H. Turner, D. F. Crawford.

For Vice-President—F. T. Hyndman, E, B. Gilbert.

For Secretary—J. D. Conway, Geo. P. Rhodes.

For Treasurer—J. D. McIlwain, R. A. Bole.

For Executive Committee—E. M. Herr, F. H. Stark, C. L. Gist, H. B. Ayers, A. W. Slocum, G. P. Sweeley, F. R. McFeatters.

Upon motion the report was accepted and the committee discharged.

Adjourned.

Report of Committtee on "Best Method of Cleaning the Exterior and Interior of Passenger Equipment Cars."

Mr. President and Gentlemen of the Railway Club of Pittsburgh:

We are notified by the Secretary of the Railway Club of Pittsburgh that we had been assigned as a committee of four to present our experience and observation, through getting up possible Formula for the Best Method of Cleaning the Exterior and Interior of Passenger Equipment Cars, which we look upon as a re-assignment of the previously debated subject of March 25th, namely: The Terminal Cleaning of Passenger Cars, which our fellow-craftsman and associate, Mr. John D. Wright, of the B. & O. R. R. Co., so ably introduced as the assignee on that occasion.

In submitting our report, we do so with the hope that those interested will kindly bear with us when making a few essential preliminary remarks, where presenting a topical matter, which seemingly is so interesting before a live Railway Club, as to cause the subject, in another guise, to be re-assigned for purpose of gaining further information. To, in a measure, account for this general interest taken by the members of the Railway Club, we will say that in looking up the past history of the Railway Master Car and Locomotive Painters Association of the United States and Canada, it can be readily observed that if there was any one subject that could be depended upon to thoroughly arouse the entire assembled fraternity, it was usually the subject of the Terminal Cleaning of Passenger Equipment Cars, when listed for debate.

As the matter of terminal cleaning and sanitation of the Passenger Car is generally understood by the world's uninitiated people in a railroad requirement sense, we have no doubt but what ninety-nine per cent would quickly settle all dispute, as judged from their view point, by prescribing an unrestricted use of the old-fashioned remedies of our mothers, that of plenty of elbow grease, soap and water, and the ever-to-be-relied-upon ventilating open window as the smoke, dirt, germ and microbe killer par excellence.

The car painter also may believe that soap and water is one of God's greatest of blessings for many purposes, but when it comes to cleaning the varnished surface of cars he wants his soap judiciously handled, from fact that he knows from long and varied experience in the railway car paint shop, that a caustic soap of any description is a bad thing to place in the hands of unskilled labor without skilled supervision. He also knows that where the body and lustre of varnish is thus destroyed by an alkali, it becomes a dead absorbent matter and, as such, must be removed before new material may be safely applied, if protection and beauty of finish be the object in view.

Such being the case, the painter in charge of equipment should not be too harshly criticized if he becomes somewhat aggressive in his position towards many so-called all neutral soaps, varnish cleaners, preservers and renewers found upon the market, which, in many instances, should be called varnish removers or destroyers, if correctly classified.

We have no doubt but what there has been and will continue to be under the many present systems of car cleaning at railway terminal points, many good brands of skillfully applied varnishes ruined and unjustly condemned, from the fact that they will not stand up under the continuous grind of such cleaning.

The experienced car painter also knows that where soaps are not thoroughly rinsed off, especially where used out-of-doors in the hot summer months, there invariably remains a deposit of free alkali, or grease, on all such cleaned surface, which in time becomes a hard glit, that, we judge, no attempt should be made to remove, unless skilfully done under shelter with a safe cleaner, which, to be safe, in our opinion, should contain neither alkali, acid, water or other injurious chemicals unscrupulously offered for purpose, or when such ill-treated varnished surface can be shopped for paint repairs.

With these preliminary remarks we will present the Committee's Formulae, which is as follows:

We would first recommend that the entire exterior of all passenger equipment, including the accommodation and through cars, be cleaned with a safe cleaner, when such cars have been out of the shop three weeks, provided all such cars, whilst in extremely hard through service or running through tunnels, shall be cleaned every three weeks at some terminal point. After the first cleaning with such safe cleaner the first mentioned class should be cleaned every four weeks, and the second every two weeks.

When such cleaning has been done, the number of the car, the place and date cleaned, should be stamped on a piece of tin provided for that purpose, attached to the cross-bearer near centre of car. Between the intervals of cleaning with such safe cleaner the exterior, excepting the roof, but including all glass, in and out, platforms, rails, handholds, steps, splash board guards and trucks, should be cleaned or wiped off with dry waste at the end of each run, excepting where in accommodation service, in which case it should be done every twenty-four hours at one terminal only. The wiping to be done with waste in the hand, giving particular attention to the edge and ends of letter boards, battons, corners, etc. We further recommend that the the washing of all cars with water, except during moist weather, or the wiping of trucks with oily waste, be positively prohibited; also that splash boards or fender guards of steps be given especial attention, so as to be clean at all times. We still further recommend that during the summer and fall months the space between deck sash and screens be cleaned out every thirty days and at least once during the winter. Also that all windows and door glass be cleaned and polished in and out with tripoli, giving particular attention along edges and corners of glass, at the end of each run, so that they always be clean and also prevent any accumulation of the hard drying substance invariably resulting from moisture and sulphurated smoke contact. Also that all brass handrailings and other brass work, where on platforms, be cleaned at the end of each run.

During freezing weather great care should be taken that platforms and steps are free from ice and snow when the cars are sent to station for service.

For all outside cleaning we would further recommend that suitable sheds containing permanent scaffolding be provided, in order that the work of exterior cleaning can be carried out at all times during the year; also that the exterior appearance of cars in all trains may be uniform in cleanliness between shopping periods.

As a matter of still furthering the uniform exterior service appearance of passenger equipment cars, we would most urgently suggest that where shopping facilities are adequate entire trains should be taken in for paint or varnish renewals, thus, in a manner, avoiding the to-be-criticised appearance of having the newly brightened up car sandwitched in, as it were, between cars badly in need of cleaning up, or paint and varnish renewals.

THE INTERIOR SERVICE CARE OF THE PASSENGER EQUIPMENT CAR.

We would first recommend that all passenger equipment cars immediately upon arrival at cleaning yards be well ventilated.

We also recommend that the entire interior surface of all passenger cars, including lamp ventilators, be blown out with compressed air once every six days, after which the surface should be thoroughly dusted and wiped clean. During the intervals of blowing out with air the entire interior surface should be dusted and wiped every third day.

Also that all doors of passenger compartments, fronts of saloons, lavatories, tool case glass, glass in top of saloons, mirrors, sash, window sills and below same, also seat arms and back bands, including all corners, be well wiped with dry waste or soft cloths at end of each run, excepting accommodation runs, etc. Also that passenger equipment cars supplied with pantesote or other curtains shall have the lower rods carefully removed from slots, and then be thoroughly wiped and dusted the full length of curtains, and carefully replaced at end of each through run, or on every second day where car is run in suburban or accommodation service.

All water coolers, we judge, should be emptied at end of each through run, and thoroughly cleaned with hot water every three days.

Wash water tanks should also be thoroughly cleaned out once a month with hot water.

The drinking glass, the brass alcove, and all brass below alcove, should be thoroughly cleaned and polished at end of each run.

We strongly recommend that from May 1st to October 1st all seat backs and cushions be thoroughly blown out with compressed air. The air syphon operated device that lifts up the dust and carries it out of window being preferred for operation. In case compressed air is not available, such backs and cushions are to be thoroughly beaten with cushion beaters twice a week, and once a week the balance of the year. We still further recommend that between intervals of blowing out with air, or beaten with beaters, all seat backs and cushions should be brushed off with a good stiff counter brush at the end of each run, after the car has been so cleaned and dusted, except in accommodation service, where it should be done as often as may be found necessary for good service.

All aisle strips also should be taken up and thoroughly cleaned by beating and sweeping, or cleaned with compressed air. They should also be thoroughly cleaned by being scrubbed and disinfected every two months.

We recommend that all floors, platforms and steps of passenger equipment cars shall be swept and thoroughly mopped with soap and water at the end of each run, except in accommodation service, where they should be swept out as often as it may be found necessary, so as to be in good condition at all time for service.

To better facilitate this cleaning of floors, we would also strongly recommend that all floors of such cars be turned out of car paint shop in a smooth, well painted condition, in order that there shall be no holes or open cracks left as receptacles for damp dirt, etc. Also that all wash basins, urinals, wet and dry hopper closets of saloons, should be well cleaned and scrubbed with soap and hot water and disinfected at the end of each run, and as often as it may be found necessary in the short runs of accommodation train service. Also that all urinals be bottom screened and iced during the hot summer months. We would further recommend that when the interior surface condition of such passenger equipment cars becomes such that the ordinary cleaning, as above stated, will not suffice, they also be cleaned with some safe cleaner.

In conclusion, we will say that we hope there will be enough friendly criticism invited to bring out both the weak and strong points in after discussion that should follow our introduction of this very interesting subject, thus presented for critical consideration before "The Railway Club of Pittsburgh."

(Signed)

JNO. F. LANFERSIEK, Chairman,
P. C. C. & St. T. L. Ry. Co.

D. W. SMITH, P. F. W. &C. Ry. Co.

B. F. WYNN, P. R. R. Co.

W. O. QUEST, Acting Secretary,
P. & L. E. R. R. Co.

MEETING OF CLUB SECRETARIES.

The annual meeting of the Society of Railway Club Secretaries was held at the United States Hotel, Saratoga, June 24, 1904. Chairman Joseph W. Taylor presiding.

At roll call the following members responded:

Western Club: Joseph W. Taylor.
New York & Central: Harry D. Vought.
New England: Prsident W. B. Leach and E. L. Janes.
Railway Club of Pittsburgh: J. D. Conway.
Honorary member: D. M. Brady.

The minutes of the meeting of June 29th, 1903, were read and approved.

The Secretary read the following communication:

Des Moines, Iowa, June 18th, 1904.

Mr. Harry D. Vought,
Secretary, S. Ry. C. Secretaries,
New York City.

Dear Sir:—Your circular favor of May 19th advising regarding the annual meeting June 24th received. Am sorry to inform you that I will be unable to attend this year; however, wish yourself and rest of members a pleasant meeting.

How would it do for all the Secretaries to meet at World's Fair some time this fall for one or two days' session? Think it would be a success from an attendance standpoint.

With best wishes, respectfully yours,

P. B. VERMILLION, Secretary.

The Secretary also read a letter of regret from Mr. W. H. Rosevear, Jr., Secretary of the Canadian Railway Club, stating that it was his intention to be present, but circumstances at the last moment prevented.

On motion of Mr. Janes it was agreed that it would not be practicable to hold a special meeting of the Society at St.

Louis, as suggested by Mr. Vermillion, but that the members would take pleasure in availing themselves of the privilege and courtesy extended by the St. Louis Club in reference to headquarters established in the Transportation Building.

The Secretary then read his annual report, as follows:

Officers and Members S. R. C. S.'s:

The Society's year just closed was eventful for the completion of the enrollment as members of this organization of every Club in the country but one, the single exception being the Rocky Mountain. The Secretary of that Club wrote our Chairman as follows:

Colorado City, November 2d, 1903.

Mr. J. W. Taylor,
Secretary Western Club,
Chicago, Ill.

Dear Sir:—I am to-day in receipt of your letter of the 30th, enclosing indexes of Railway Club meetings, for which please accept my thanks.

Would appreciate it if you would put me in the way of joining your association of Railway Club Secretaries.

Was not aware of the existence of such an association until now, although our Club has had a life of several years.

Very truly yours,
M. M. CURRIER, Secretary.

Your Secretary wrote Mr. Currier as follows, but has never had a reply to his letter:

November 8th, 1903.

Mr. M. M. Currier,
Secretary Rocky Mountain Club,
Colorado City, Col.

Your letter relative to membership in the Society of Railway Club Secretaries, addressed to our Chairman, Mr. J. W. Taylor, of the Western Club, has been referred to me.

I have much pleasure in sending you herewith copy of the minutes of our last annual meeting with Book of Regulations which will give you full information as to membership. By comparing the two you will note some changes, revision of Regulations having not yet been published.

Upon receipt of your application for membership with assessment for this year's expenses amounting to $10.00, I will take pleasure in enrolling your Club. It will not be possible to furnish copies of Index of Subjects this year for members of your Club as supply has been entirely exhausted. Regret not having your application earlier, in which event it would have been otherwise.

Secretary's official badges are being made and if you enroll one will be sent you. An early and favorable reply will be appreciated.

Very truly yours,

HARRY D. VOUGHT, Secretary.

The changes in our regulations were submitted to letter ballot in accordance with your directions and affirmative votes were received from all members with the exception of the Pacific Coast and Southern and Southwestern Clubs, which failed to respond.

Publication of the Index of Papers and Subjects discussed by the various Clubs was unavoidably delayed beyond the time agreed upon at our last meeting owing to the failure of Secretaries to promptly respond to the Secretaries request for their list of subjects and the number they would require for distribution among their members.

With this information finally in hand the compilation was completed and 6,000 copies of the Index printed and supplied to the various Clubs as follows:

New York	1,265
Central	350
Western	1,100
Northwest	300
St. Louis	1,100
Southern and Southwestern	250

Pacific Coast	400
Canadian	400
Pittsburgh	400
Richmond	300
Iowa	50

Mr. D. M. Brady, Mr. E. L. Janes and the Secretary as a special Committee on membership badge, following negotiations with manufacturers, agreed upon a design, the lowest price obtainable being $6.50 per badge. An order was given for a sufficient number to supply each Secretary and likewise to present one to Mr. Bardy as founder of the Society and its only honorary member. The total expense was $84.50.

What will some day be esteemed the most important and valuable work that the Secretary has been able to perform for the Society, is a compilation of its business transactions and the completion of a record in type written and book form of the minutes from the inception of the organization down to the present day. It was necessary to employ the assistance of a stenographer and typewriter at an expense of $5.00, for which an appropriation is asked.

The individual members have now followed out the arrangement agreed upon last year for an exchange of meeting notices and the publication in each issue of their Proceedings of an Index of the subjects discussed by their respective Clubs. The Central Club seems to be the only one that has done this. It might perhaps be well to have a better understanding as to this feature in the future, with a view to determining whether its continuance is desirable.

The proposed new edition of the Society's history and the regulations as amended was not published for several reasons, the most vital of which was that our funds were low and this suggested the propriety of a postponement to a later date. Furthermore, with no new Club appearing, the number of old copies still in the hands of members and our records now in permanent shape, the necessity of a new supply of this Prospectus does not appear to be immediate or urgent.

The following financial statement is believed to be all that remains to round out this report of the year's work or that is necessary to indicate whether the Secretary has properly met the obligations and responsibilities you imposed upon him.

RECEIPTS.

Date	Club.	Amount.
1903.		
July 2nd	Richmond	$ 10 00
Aug. 3rd	Iowa	5 00
" "	Northwest	10 00
" "	New England	10 00
" "	Central	10 00
Oct. 23rd	Iowa	5 00
Nov. 1st	Western	10 00
" 11th	Pittsburgh	10 00
" 12th	Southern and Southwestern	10 00
" 19th	St. Louis	10 00
" 27th	New York	10 00
" 28th	Pacific Coast	10 00
		$110 00
	Balance last report	73 96
	Total	$183 96

DISBURSEMENTS.

Date, 1903.		
July 23rd	Typewritten copies to members of minutes	$ 3 00
" "	Postage	1 00
Nov. 2nd	Printing Index of Subjects	80 00
" 19th	Badges for members	84 50
1904.		
May 20th	Postage	68
" 31st	Record book, etc.	1 25
	Total	$170 43

RECAPITULATION.

Total Receipts.........—...........	$183 96
Total Disbursements..................	170 43
Balance on hand, 1904.............	$ 13 53

Vouchers for printing of Index and for Secretaries badges are herewith attached.

Respectfully submitted,

HARRY D. VOUGHT, Secretary.

On motion of Mr. Leach the payment of 5.00 for the compilation of the records of the Society was authorized.

On motion of Mr. Janes it was decided that the printing of a new edition of the Prospectus heretofore issued by the Society was not essential.

On motion of Mr. Conway it was decided to continue the publication of Index of Subjects discussed by the various Clubs and not to continue list of subjects from time to time in Proceedings of different Clubs.

The annual assessment for expenses of the Society for the ensuing year was fixed at $10.00 per Club.

On motion of Mr. Brady the officers elected in 1903 be continued for another year.

On motion of Mr. Conway a copy of the minutes of this meeting were ordered sent to the Secretary of each Club.

There being no further business the Society, on motion of Mr. Janes, adjourned, subject to the call of the Chair.

HARRY D. VOUGHT, Secretary-Treasurer.

EDWARD KERR, President. W. R. BROWN, Supt. G. W. GOSSER, Sec'y and Treas.

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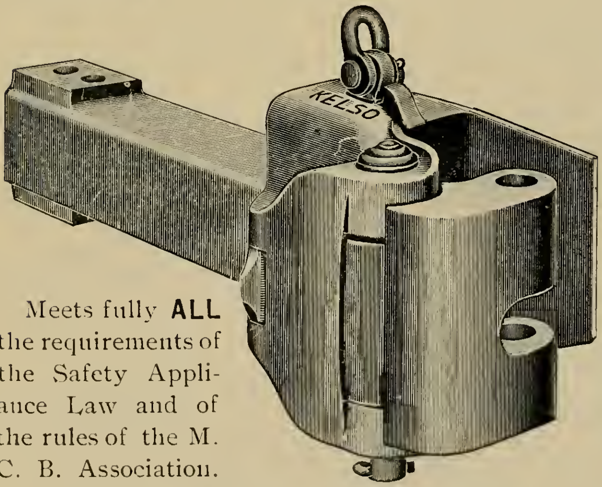

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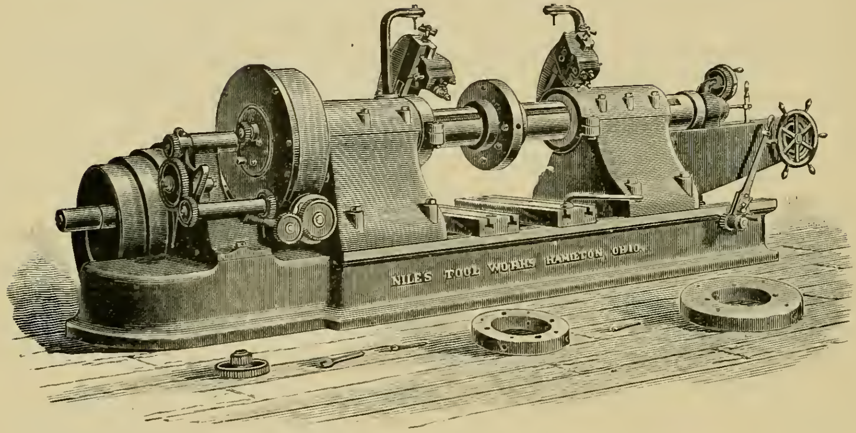

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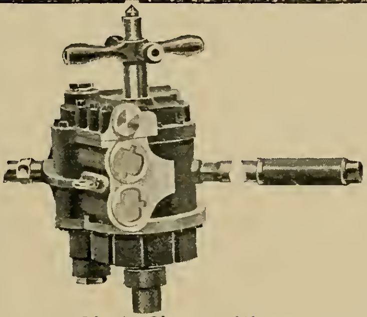

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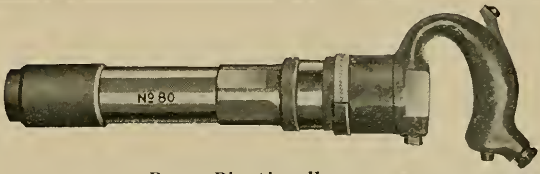

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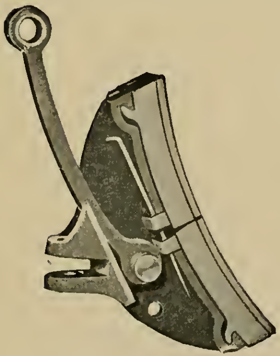

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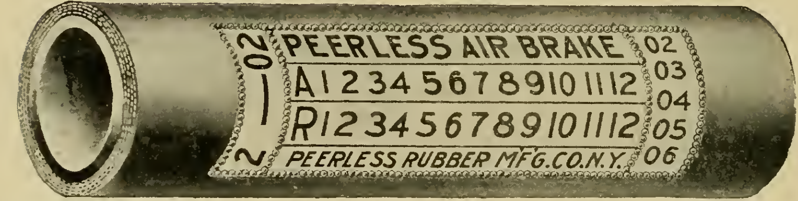
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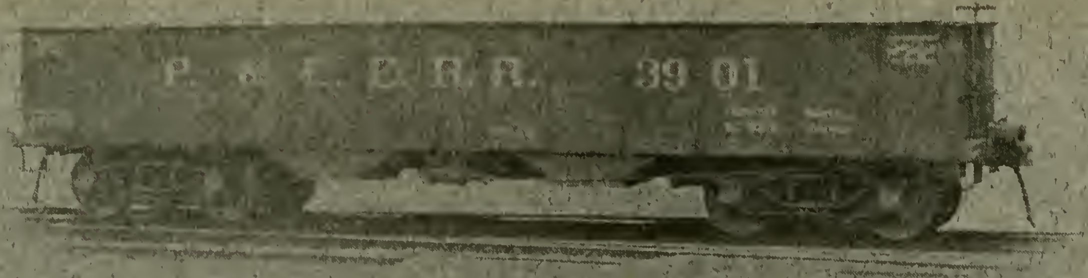

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Classified Index of Advertisements

Air Brakes—
Westinghouse Air Brake Co... ix

Air Compressors—
Chicago Pneumatic Tool Co.......... xiii
Manning, Maxwell & Moore............ xv

Babbit Metal—
Damascus Bronze Co., Inside front cover
Lawrenceville Bronze Co.,.............. xi
Magnus Metal Co.,.................... vi

Belting—
J. D. McIlwain & Co.,................ x
Hukill-Hunter Co.,............................ xvi

Boiler Washers and Testers—
Nathan Manufacturing Co.,............ iv

Boiler Lagging—
Franklin Manufacturing Co............ xv

Boiler Tubes—
National Tube Co.,..................... v

Bolsters—
Pressed Steel Car Co.,.......................
Outside back cover

Brass and Bronze Castings—
Damascus Bronze Co.,.....................
Inside front cover
Lawrenceville Bronze Co.,................ xi
Magnus Metal Co.,............................ vi

Brake Beams—
Damascus Brake Beam Co......... xvi

Brake Shoes—
American Brake Shoe & Foundry Co. ii
Hukill-Hunter Co.,..... xvi

Car Couplers—
Gould Coupler Co.,............................ ii
McConway & Torley Co.,.................. xi
National Malleable Castings Co.,...... vi

Car Heating and Lighting—
Gold Car Heating Co.,...................... vi
Safety Car Heating and Lighting Co. xiii

Castings—Malleable Iron—
National Malleable Castings Co.,...... vi

Coal and Coke—
Washington Coal and Coke Co.,....... xii

Conveying Machinery—
J. D. McIlwain & Co.,...................... x
Manning, Maxwell & Moore............ xv

Corner Bands—
Pressed Steel Car Co.,......................
Outside back cover

Drills—Twist—
Cleveland Twist Drill Co.,................
Inside front cover

Friction Draft Gear—
Westinghouse Air Brake Co.,........... ix

Graphite—
Jos. Dixon Crucible Co..................... vi

Hoisting Engines—
J. D. McIlwain & Co ,...................... x

Hose Clamps—
J. D. McIlwain & Co.,.... x

Injectors—
Nathan Manufacturing Co.,............ iv

Jacks—
J. D. McIlwain & Co.,....................... x
Hukill-Hunter Co............ xvi

Journal Bearings—
Damascus Bronze Co.,.....................
Inside front cover
Lawrenceville Bronze Co.,...... xi
Magnus Metal Co.,.......................... vi

Locomotives—
American Locomotive Co...... xiv

Lubricators—
J. D. McIlwain & Co.,....... x
Nathan Manufacturing Co.,............ iv

Machine Tools—
Niles Tool Works,...................... xii
Manning, Maxwell & Moore.......... xv

Magazines—
Railway Age.............................. iii

Malleable Iron—
Fort Pitt Malleable and Grey Iron Co...xvii

Oils—
Galena Signal Oil Co.......... xvii

Oil Cups—
Nathan Manufacturing Co.,............ iv

Packing—
J. D. McIlwain & Co.,...................... x
Franklin Manufacturing Co.,.......... xv

Paints—
Sherwin—Williams Co.,.................... ii
The Lowe Brothers Co.,.................... xvi
M. B. Suydam Co. i
Chas. R Long, Jr........... iii

Paint Machines—
J. D. McIlwain & Co.,....................... x

Pipe and Pipe Fittings—
National Tube Co.,.......................... v

Pipe Joint Paste and Compound—
Jos. Dixon Crucible Co.................... vi

Pneumatic Tools—
Chicago Pneumatic Tool Co,.......... xiii
Manning, Maxwell & Moore............ xv

Pulleys—
J. D. McIlwain & Co.,......... x
Hukill-Hunter Co.,......... xvi

Reamers—
Cleveland Twist Drill Co.,................
Inside front cover

Rubber Goods—
Peerless Rubber Mfg. Co.,................ xvi
Hukill Hunter Co.,................ xvi

Safe Ends for Boiler Tubes—
National Tube Co.,........................... v

Index—Continued.

Side Stakes—
Pressed Steel Car Co., ... Outside back cover

Spring Buffer Blocks—
Gould Coupler Co., ... ii

Stay Bolt Iron—
B. M. Jones & Co. xiv
Sligo Iron & Steel Co. xviii

Stake Pockets—
Pressed Steel Car Co., ... Outside back cover

Stay-Bolt Taps—
Cleveland Twist Drill Co., ... Inside front cover

Steam Fire Extinguishers for Locomotives—
Nathan Manufacturing Co., ... iv

Steel Tires—
Latrobe Steel Co., ... iv

Steel Tired Wheels—
Railway Steel Spring Co... xiii

Springs—
Railway Steel Spring Co......... xiii

Steel Cars—
Pressed Steel Car Co., ... Outside back cover

Steel—Mushet's—
B. M. Jones & Co. xiv

Tools—
Cleveland Twist Drill Co., ... Inside front cover

Trucks and Truck Frames—
Pressed Steel Car Co., ... Outside back cover

Valves—
Homestead Valve Mfg. Co...... iv

Varnishes—
Sherwin-Williams Co., ... ii

Ventilators—
Pullman Automatic Ventilator Co. ii

Weldless Steel Flanges—
Latrobe Steel Co., ... iv

Wheels—
National Car Wheel Co., ... Inside front cover

Wooden Cars—
Pressed Steel Car Co., ... Outside back cover

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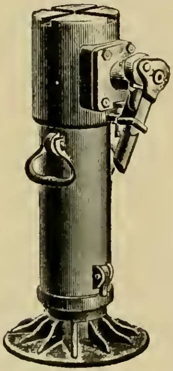
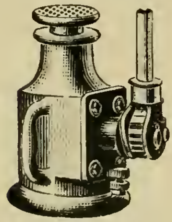
208-210 Third Avenue, - - Pittsburg.

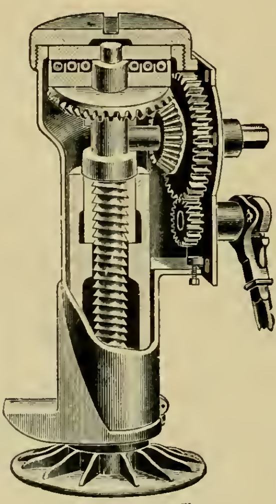
Norton Ball-Bearing Jacks.



Style C, 35 Tons, 26 and 31 in. high.



Style K, 15 tons



Style B. J., 70 Tons, 26 in. high.

50 Styles. 8 to 70 Tons Capacity.

☞ Here are a few just the thing ☜
☞ for heavy work. ☜

Samples sent to any Railroad Company on 30 days trial.

J. D. McIlwain & Co.

Sole Agents.

208-10 Third Ave., Pittsburg, Pa.

ALSO SOLE AGENTS FOR

Leviathan Belting and Supplies. Clancy Rust Proof Hose Clamps. Jackson Belt Lacing Machines and Supplies Keasey Wood Split Pulley. Shafting and Hangers Roberts Hand and Push Cars. Railway Mill, Mine and Contractors' Supplies.

OFFICIAL PROCEEDINGS

of the

Railway Club *of* Pittsburgh.

ORGANIZED OCTOBER 18, 1901.

OFFICERS, 1903-1904.

President,
L. H. TURNER,
Supt. Motive Power, P. & L. E. R. R., Pittsburgh, Pa.

Vice-President,
F. T. HYNDMAN,
S. M. P., Bflo., Roch. & Pgh R. R. Co.,
Du Bois, Pa.

Treasurer,
J. D. McILWAIN,
Sales Agent, J. D. McIlwain & Co.,
Pittsburgh, Pa.

Secretary,
J. D. Conway,
Chief Clerk, Supt. M. P., General Offices P. & L. E. R. R., Pittsburgh, Pa.

Executive Committee,
E. M. HERR,
Gen'l Manager Westinghouse Air Brake Co.
Pittsburgh, Pa.

C. L. GIST,
Superintendent Transportation, P. & L. E. R. R., General Offices,
Pittsburgh, Pa.

F. H. STARK,
Superintendent Rolling Stock, Pittsburgh Coal Company, Coraopolis, Pa.

VOL. III.
NO. 9.

Pittsburgh, Pa., October 28, 1904.

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Published monthly, except June, July and August, by the Railway Club of Pittsburgh,
J. D. Conway, Secretary, General Offices P. & L. E. R. R., Pittsburgh, Pa.

Meetings held fourth Friday each month, except June, July and August.

PROCEEDINGS OF ANNUAL MEETING, OCTOBER 28th, 1904.

The meeting was called to order at 8 o'clock, P. M., at the Monongahela House, Pittsburgh, Pa., with President L. H. Turner in the chair.

The following gentlemen registered:

MEMBERS

Alexander, J. R.
Anderson, H. H.
Anderson, H. T.
Barnsley, Geo. T.
Blair, A. C.
Blattner, Jos.
Bole, R. A.
Bowery, Fred.
Brand, Thos.
Brittain, Jno. B.
Brown, E. W.
Carson, G. E
Chittenden, A. D.
Conway, J. D.
Cottrell, Wm.
Courtney, D. C.
Cox, Geo. W.
Dambach, C. O.
Davis, Thos. R.
Decker, O. S.
Dyer, Jos.
Fitzgerald, J. O.
Ford, D. W.
Forsberg, R. P.
Frank, L. W.
Frost, H. W.
Gies, Geo. E.
Gray, R.
Grooms, J. C.
Grubbs, Barton.
Hall, W. G.
Halleran, H. J.
Harris, J. D.
Hastings, C. L.
Hempsted, J. G.
Herman, R.
Hoffman, N. K.
Lawson, S. L.
Lee, L. A.
Lininger, W.
Lobez, P. L
Ludgate, B. A.
Lynn, Samuel.
Macoubray, R. J.
Michel, Wm. J.
Miller, M. M.
Milliken, I. H.
McDaniel, Mark.
McFeatters, F. R.
McIlwain, H. M.
McIlwain, J. D.
McKee, S. F.
McMullen, F. V.
McNamara,, D.
McNulty, F. M.
Oates, Geo. M.
Obey, G. B.
Palmer, C. A.
Porter, Chas.
Porter, H. V.
Redding, D. J.
Reese, E.
Reeve, F. J.
Safford, J. B
Scheck, H. G.
Shaler, F. I.
Simons, J. E.
Sipe, Geo. T.
Slocum, A. W.
Smith, L. W.
Snyder, Antis.
Stark, B. F.
Stark F. H.
Stratton, G. W.

Holbrook, D. O.
Hood, D. G.
Hooff, J. L.
Horner, H. G.
Howe, D. M.
Huyett, E. G
Hyndman, F. T.
Johnson, A. B.
Johnston, L. S.
Kearney, A.
Keppel, A. M. Jr.
Kerr, Geo. M.
Kessler, D. D.
King, C. F.
Klee, W. B.
Knight, E. A.
Lanfersiek, Jno. F.
Stucki, A.
Swann, J. B.
Taylor, H. G.
Tesseyman, J. E.
Townsend, T. E.
Tracy, M. S.
Tucker, J. L.
Turner, L. H.
Ward, Jno.
Warne, J. C.
Warnock, H. R.
Weigel, F. S.
Whitney, Louis B.
Winlo, R. C.
Winneal, W. W.
Wood, C. V.
Wynn, B. F

VISITORS

Anderson, A. E.
Arthur, Hugh.
Bealer, B. G.
Fairhead, J. E.
Fenwick, Wm.
Follet, Chas. S.
Duer, B. W.
Garabrant, W. P.
Gearhart, J. A.
Hall, C. W.
Hanna, B. C.
Holpp, Jno. L.
Hubbard, Chas.
Hyde, Geo
Kalbaugh, C. T.
Korba, W. J.
Myers, C. T.
McClurg, J. S.
Newell, E. W.
Patterson, C. C.
Patterson, J. W., Jr.
Rodgers, Chas. W.
Seller, E. W.
Smith, S. B.
Spangler, C. P.
Stafford, B. E. D.
Statler, L. D.
Stanton, Geo.
Taylor, B. C.
Way, L. A.
Weber, G. L.
Wynne, Jno. H.
Zelch, J. L.

PRESIDENT: Gentlemen, the first order of business should be the reading of the minutes of the last regular meeting. But as those minutes have been printed and are already in your hands, if there are no objections or corrections, the minutes will stand approved as printed.

Secretary J. D. Conway then read the list of proposals for membership, as follows:

R. Blickensderfer, Manager, Wabash-Pittsburgh Terminal Railway Company, Cleveland, O.

E. C. Brainerd, Sales Agent, Nicola Brothers Company, Farmers Bank Building, Pittsburgh, Pa.

J. B. Brooks, Superintendent Construction, Westinghouse Air Brake Company, Wilkinsburg, Pa.

R. F. Darby, Chief Draftsman, P. & L. E. R. R. Co., General Office, Pittsburgh, Pa.

J. E. Fairhead, Chief Clerk to Superintendent, Wabash-Pittsburgh Terminal Railway Company, Wabash Building, Pittsburgh, Pa

O. G. Ferguson, Trainmaster, Monongahela Connecting Railroad Company, Second Ave., near Bates Street, Pittsburgh, Pa.

Charles S. Foller, Rep. Union Spring and Mfg. Co., Frick Building, Pittsburgh, Pa.

Jno. M. Gillespie, General Sales Agent, Lockhart Iron and Steel Company, McKees Rocks, Pa.

D. Hunter, Jr., District Manager, Under-Feed Stoker Company of America, Park Building, Pittsburgh, Pa.

W. J. Korba, Machinist, Monongahela Connecting Railroad Company, Second Avenue, near Bates Street, Pittsburgh, Pa.

D. L. Macomber, Resident Manager, Pratt & Whitney Company, Frick Building, Pittsburgh, Pa.

Geo. E. Mitchell, Rep. J. R. Clancy, 247 N. Salina Street, Syracuse, N. Y.

Walter G. Mortland, Secretary and Treasurer, International Supply Company, Frick Building, Pittsburgh, Pa.

J. K. Nickel, Chief Clerk to Master Mechanic, Monongahela Connecting Railroad Company, Second Avenue near Bates Street, Pittsburgh, Pa.

J. W. Patterson, Jr., Superintendent, Wabash-Pittsburgh Terminal Railway Company, Wabash Building, Pittsburgh, Pa.

C. W. Rodgers, Chief Clerk Car Department, Buffalo, Rochester & Pittsburgh Railway Company, DuBois, Pa.

B. E. Schnatterbeck, Pittsburgh Manager, "Engineering and Mining Journal," Pittsburgh, Pa.

O. M. Shaw, Foreman Carpenter, Baltimore & Ohio Railroad Company, Glenwood, Pa.

Wm. C. Shuck, with Lockhart Iron and Steel Company, McKees Rocks, Pa.

C. P. Spangler, Foreman of Carpenters, Monongahela Connecting Railroad Company, Second Avenue, near Bates Street, Pittsburgh, Pa.

P. S. Strain, Cost Clerk, Pressed Steel Car Company, McKees-Rocks, Pa.

Clement F. Street, Commercial Engineer, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

Holmes Ward, Jr., Draftsman, Castle Shannon, Pa.

W. J. Wilson, Engineer, Pittsburgh & Lake Erie Railroad Company, McKees Rocks, Pa.

Jno. Zelch, Master Mechanic, Jones & Laughlin Company, Pittsburgh, Pa.

Wm. Ward, the Wm. Ward Machine Tool Company, House Building, Pittsburgh, Pa.

M. E. Wallace, Superintendent, Westinghouse Air Brake Company, Box 42, Wilmerding, Pa.

B. G. Bealor, Manager, Winfield R. R. Co., 421 Wood St., Pittsburgh, Pa.

PRESIDENT: As soon as these names have been favorably passed upon by the Executive Committee, the gentleman will become members of the Club.

Under the order of Communications Secretary Conway read the following:

THE WESTERN UNION TELEGRAPH COMPANY.

New York, Oct. 28, 1904.

To J. D. Conway, Pittsburg:

Regret exceedingly that matters over which I had no control compelled me to forego pleasure of being with your club this evening. Trust you will have a delightful time.

J. RAMSEY, JR.

THE WABASH-PITTSBURGH TERMINAL RAILWAY COMPANY.

Pittsburgh, Pa., Oct. 28th, 1904.

Mr. J. D. Conway, Secy. Ry. Club, of Pittsburgh; Care P. & L. E. R. R., Pittsburgh, Pa.:

Dear Sir—I exceedingly regret to advise you of my inability to meet with you this evening at the Annual Smoker to be held at the Monongahela House.

Unfortunately a question comes up that forces me to forego the great pleasure I anticipated in attending your meeting. Hoping that on some future occasion I may have the honor to attend one of your meetings, I remain,

Yours Very Truly,

W. D. HOLLIDAY,

Traffic Manager.

PRESIDENT: We had hoped to have Mr. Ramsey here to address us this evening, but business unavoidably detained him, and he could not get here, for which we are very sorry.

We will now hear the reports of the Secretary and Treasurer for the year.

SECRETARY: Gentlemen, I shall not bore you by reading the entire report now. It will appear in full in the next number of the Official Proceedings. Let it suffice to give you just an abstract of the financial and membership portion of it.

Our membership reported last year was 412. There have been received into membership during the past year 142. There have been lost by suspension, resignation and death during the year 44, making the present membership 510.

The financial report shows that the receipts have been as follows:

In the hands of the Treasurer last year	$ 969.42
We have received during the year	3,031.14
Total receipts	$4,101.06
Our disbursements amounted to	2,901.40

Leaving a balance on hands (as it is hoped) of $1,199.66. This appears to be confirmed by the statement received from the Treasurer, as he shows a balance on hand at last report of

$969.42. Paid out on proper orders $2,901.40, leaving a balance on hand of $1,199.66. As we got together and made up these reports, of course it will be assumed that there will be no discrepancy between them. (Laughter.)

REPORT OF THE SECRETARY.

Year Ending October 28th, 1904.

This meeting closes the third year's existence of this Club, and your Secretary may be permitted to briefly summarize the events of the year, which must be certainly gratifying to both the officers and members, and this result is due to the fact that the interest is kept alive by the co-operation of both.

The annual report last year showed a membership of 412, and with the close of this year we have 510 members or a net gain of 98 members; our growth has been remarkable for a "three-year-old."

The papers presented were of especial interest, which accounts very largely for the good attendance at our meetings and also the prominence our Club has attained as an organization of its kind.

In reviewing the matters of importance during the year, there are many things that might be favorably mentioned, among which is our standing Committee on Revision of the M. C. B. Rules, appointed at our meeting December 28, 1903. This Committee, which is made up of practical car men appears to be a step in the right direction, and invited special recognition in the address of the President of the M. C. B. Association before its meeting last June at Saratoga.

The financial statement following will show that, while our expenditures are a little greater than the previous year, we still have a balance on the right side. Our progressive friends, whose advertisements are shown in our Proceedings, have been loyal to the Club, and largely responsible for its success, and, gentlemen, let us join with one accord in not only wishing them well, but give them our ORDERS.

We have within the year lost by death but two of our members, Mr. John Hare, of the Niles Tool Works, and Mr. E. R. de-Grain, material inspector, B. & O. R. R. Co.

The following is a summary of membership and our financial condition up to and including this meeting:

MEMBERSHIP.

Reported last year	412	
Received into membership	142	554
Suspended non-payment of dues	17	
Resigned	18	
Loss of address	7	
Removed by death	2	44
Present membership		510

FINANCIAL.

Receipts:		
In hands of Treasurer last year	$ 969.42	
From advertisers	1,352.00	
From dues	1,489.00	
From sale of Proceedings	9.64	
From supply men, entertainment committee	281.00	$4,101.06
Disbursements:		
Printing Proceedings, advance sheets and notices	1,027.55	
Hotel, luncheon, etc.	856.85	
Postage, for Journals, correspondence, etc.	186.75	
Secretary's trip to Saratoga	46.00	
Assessment, 2 yrs. Club Secretaries Soc.	20.00	
Salary, Secretary, year 1902-1903	500.00	
Reporting Proceedings	135.00	
Entertainment	110.00	
Stationery and supplies	19.25	2,901.40
Balance in hands of Treasurer		$1,199.66

J. D. CONWAY,
Secretary.

Approved:
E. M. HERR,
F. H. STARK,
C. L. GIST.
Executive Committee.

TREASURERS REPORT.

For the year ending Oct. 28th, 1904.

Balance on hand, last report	$ 969.42	
Received from Secretary	3,131.64	$4,101.06
Paid out on Sec't Checks	$2,901.40	
Balance on hand Oct., 1904	1,199.66	$4,101.06

J. D. McILWAIN,
Treasurer.

Approved:
E. M. HERR,
F. H. STARK,
C. L. GIST.
Executive Committee.

PRESIDENT: I regret to have to announce the death of two of our members very recently, Mr. John Hare, of the Niles Tool Works, and Mr. E. R. de-Grain, of the Test Department of the B. & O. It is fitting that this Club express in an appropriate manner its sorrow at the loss of these members, who were loved and respected by all who knew them. And as a Committee to draft suitable resolutions on the death of Mr. de-Grain, I will appoint Mr. A. Kearney and Mr. J. F. Prendergast, of the B. & O. R. R. Co., and Mr. E. W. Grieves, of the Galena Signal Oil Company. And upon the death of Mr. John Hare, I will appoint Mr. Frank B. Ward, of the Niles Tool Works; Mr. Robt. A. Bole, of Manning-Maxwell-Moore, and Mr. J. L. Hukill, of the Hukill-Hunter Company.

Mr. Secretary, will you read the result of the election?

SECRETARY: Mr. President and Gentlemen. As our Constitution does not require that we read the entire vote, but requires that we give the vote for the person receiving the highest number for each particular office, and in addition to that show the entire number of votes received by each person, I will read the results as to those who have been elected for the ensuing year:

For President, L. H. Turner received 215 votes.

For Vice President, F. T. Hyndman received 183 votes.

For Secretary, J. D. Conway received 251 votes.

For Treasurer, J. D. McIlwain received 194 votes.

For Executive Committee, E. M. Herr received 167 votes; F. H. Stark received 139 votes; C. L. Gist received 123 votes.

PRESIDENT: Gentlemen, the evening will be given up largely to matter of a social nature, and I desire to take this opportunity to thank you all for this renewed expression of confidence; and to thank the officers particularly for their efficient co-operation during the year. From the Secretary's report you can see that we are in a very pleasing and prosperous condition. Our membership is increasing and the balance in the treasury is on the right side in a very nice sum. We have a number of good papers promised for the coming year, and there is a project on foot which will, we hope, add further to the interest of our meetings. And at the expiration of this next year we fully expect to show a still larger membership, and possibly more money in the treasury.

All matters of a business nature to come before the Club this evening having been disposed of, the further conduct of the evening's entertainment which has been provided, will be under the direction of our Secretary.

SECRETARY: Gentlemen, we have arranged for this evening a musical and entertainment programme which will be somewhat varied in character, but which nevertheless we hope will please you.

The railroad field has developed some very remarkable geniuses who have achieved world-wide renown, and among our entertainers to-night is one, Mr. Burke C. Taylor, who at one time was an "eagle eye" on the B. & O., who, no doubt, during that time while thus engaged was making a careful study of Mr. J. W. Riley—of course I allude to James Whitcomb Riley, the Hoosier Poet. But this gentleman can outwhit Whitcomb Riley in his interpretation of the beloved poet's works.

Luncheon was then served, and after the smoke Jacks were properly adjusted the smoker was on, intermingled with the programme of entertainment following:

1.

Overture, Piano, Selected..................Mr. Guy Deham

2.
Pittsburg's Youngest Commedian,
MASTER GLEN LEWIS,
The Boy Wonder.

3.
MR. JAMES P. DUNLEVY,
Songs.
"A Thousand Leagues Under the Sea."
"Goodby Little Girl, Goodby."
Recitation.
THE FIDDLE TOLD.

4.
MR. BURK C. TAYLOR,
Monologue and Recitation.

5.
Violin Solo .... Mr. Jos. A. Bookmyer
1. "ROMANCE." 2. "TRAUMERIE."

6.
MR. ARTHUR T. DUNLEVY,
Songs.
"Back, Back, Back to Baltimore."
"That's How I Love You Mamie."
Recitation.
A FINISH FIGHT.

7.
MR. ED M. BONNELL,
Songs.
"Wouldn't It Make You Hungry?"
"Watermelon Times."
And Did Things on His Autoharps.

8.
MR. DAL. JEFFRIES,
The World's Champion, in Marvelous Bag Punching.

9.
MR. JAMES P. DUNLEVY,
Song.
"Make a Fuss Over Me."
Told Things and Sang
"Teasing."
F-I-N-A-L-E.

In Memoriam.

John Hare, one of the earliest members of this club, died at his home in this city on September 23, 1904, and the committee appointed to prepare a minute on his death, desire to record the following resolution:

Resolved: That in the death of Mr. Hare, the club has lost one of its most influential and active members, and the community in which he lived a citizen of sterling integrity, faithful in the performance of all the duties devolving upon him.

Mr. Hare was a native of Allegheny, Pa., and spent almost all of his life in this community. After acquiring the elements of a thorough common school education he was apprenticed to the machinist trade, and after serving his time followed that occupation for several years, when, believing his education and experience fitted him for a broader field of usefulness, he entered the sales department of one of the large sewing machine companies, and later successively took up the sale of steam pumping machinery and machine tools, representing for several years the Gordon Steam Pump Co., at that time owned by the Niles tool works interests, and in this field he attained great success; so marked indeed was the development of his talents as a salesman in this field, that it later resulted in his taking up with the Niles tool works and its successor, the Niles-Bement-Pond Co., the sale of their full line of machine tools, and for the past 15 years he has been actively identified with that company, and no man in the trade had a larger circle of friends or was more highly esteemed for his character, ability and integrity, and few have been so eminently successful in furthering the great interests he so ably represented.

In his social, business and family relations he fulfilled all the duties devolving upon him with fidelity and zeal, and we should all profit by the study of a life so full and complete in all its relations as was his.

We mourn his loss, and recommend that this minute be spread on the club records, and that a copy be sent to his bereaved family, with whom we deeply sympathize in their sad loss.

FRANK B. WARD, Manager,
Niles Tool Works Co., Pittsburg, Pa.

ROBT. A. BOLE, Manager Pittsburgh Branch,
Manning,-Maxwell & Moore.

J. L. HUKILL, President,
Hukill-Hunter Co., Pittsburgh, Pa.

COMMITTEE.

Edward Reinhold de-Grain.

Died at Garrett, Indiana, October 25th, 1904, of appendicitis, at the age of 26 years. He was born on the ocean enroute to America, was a graduate of the high school of Washington, D. C., and in 1903 took a degree of mechanical engineering at Cornell University.

At his graduation selected for his thesis a test of high speed locomotives on the Baltimore & Ohio railroad, and it was perhaps at this time that the fascination for railroad life most appealed to him, resulting in engaging with that road in the capacity of an engineer in the physical laboratory at Baltimore.

Pursuing his investigation of some experimental subjects, he went to one of the system shops, located at Garrett, Indiana, on Wednesday, October 19th, just six days before his death, apparently in good health, but on Friday was taken ill at the hotel and later removed to the Sacred Heart hospital, where an operation was undertaken. He continued to sink rapidly, however, and very little hopes were entertained for his recovery. His father arrived on Monday morning from Washington, D. C., and on the following morning the end came.

Mr. de-Grain's career on the railroad was comparatively short but his conscientious efforts, his enthusiasm and lovely character gained for him many good friends.

A. KEARNEY, S. of M. P., B. & O. R. R. Co.
J. F. PRENDERGAST, M. M., B. & O. R. R. Co.
E. W. GRIEVES, Galena Signal Oil Co.
COMMITTEE.

NOTE: Bound copies of proceedings, Vol. 2, for year 1902-1903, are ready for distribution and will be furnished to members at 50 cents per copy. We also have a few copies left of Vol. 1, for year 1901-1902, which can be had for same price.

J. D. CONWAY, Secretary.

RAILWAY CLUB OF PITTSBURGH.

CONSTITUTION.

ARTICLE I.

The name of this organization shall be "The Railway Club of Pittsburgh."

ARTICLE II.

OBJECTS.

The objects of this Club shall be mutual intercourse for the acquirement of knowledge, by reports and discussion, for the improvement of railway operation, construction, maintenance and equipment, and to bring into closer relationship men employed in railway work and kindred interests.

ARTICLE III.

MEMBERSHIP.

Section 1. The membership of this Club shall consist of persons interested in any department of railway service or kindred interests, or persons recommended by the Executive Committee upon the payment of the annual dues for the current year.

Sec. 2. Persons may become honorary members of this Club by a unanimous vote of all members present at any of its regular meetings, and shall be entitled to all the privileges of membership and not be subject to the payment of dues or assessments.

ARTICLE IV.

OFFICERS.

The officers of this Club shall consist of a President, Vice President, Secretary, Treasurer, and three elective Executive members who shall serve a term of one year from the date of their election, unless a vacancy occurs, in which case a successor shall be elected to fill the unexpired term.

ARTICLE V.

DUTIES OF OFFICERS.

Section 1. The President will preside at all regular or special meetings of the Club and perform all duties pertaining to a presiding officer; also serve as a member of the Executive Committee.

Sec. 2. The Vice President, in the absence of the President, will perform all the duties of that officer, also serve as a member of the Executive Committee.

Sec. 3. The Secretary will attend all meetings of the Club or Executive Committee, keep full minutes of their proceedings, preserve the records and documents of the Club, accept and turn over all moneys received to the Treasurer at least once a month, draw cheques for all bills presented when approved by a majority of the Executive Committee present at any meetings of the Club, or Executive Committee meeting. He shall have charge of the publication of the Club proceedings and perform other routine work pertaining to the business affairs of the Club under the direction of the Executive Committee.

Sec. 4. The Treasurer shall receipt for all moneys received from the Secretary and deposit the same in the name of the Club within thirty days in a bank approved by the Executive Committee. All disbursements of the funds of the Club shall be by cheque signed by the Secretary and Treasurer.

Sec. 5. The Executive Committee will exercise a general supervision over the affairs of the Club and authorize all expenditures of its funds. The elective members of this Committee shall also perform the duties of an auditing committee to audit the accounts of the Club at the close of a term or at any time necessary to do so.

ARTICLE VI.

ELECTION OF OFFICERS.

Section 1. The officers shall be elected at the regular annual meeting as follows, except as otherwise provided for:

Sec. 2. Written forms will be mailed to all the members of the Club, not less than twenty days previous to the annual meeting, by the three elective members of the Executive Committee. These forms shall provide a method, so that each member may express his choice for the several offices to be filled.

Sec. 3. The three elective members of the Executive Committee will present to the President the names of the members receiving the highest number of votes for each office, together with the number of votes received.

Sec. 4. The President will announce the result of the ballot and declare the election.

Sec. 5. Should two or more members receive the same number of votes, it shall be decided by a vote of the members present, by ballot.

ARTICLE VII.

AMENDMENTS.

Amendments may be made to this Constitution by written request of ten members, presented at a regular meeting and decided by a two-thirds vote of the members present at the next regular meeting.

BY-LAWS.

ARTICLE I.

MEETINGS.

Section 1. The regular meetings of the Club shall be held at Pittsburgh, Pa., on the fourth Friday of each month, except June, July and August, at 8:00 o'clock P. M.

Sec. 2. The annual meeting shall be held on the fourth Friday of October each year.

Sec. 3. The President may, at such times as he deems expedient, or upon request of a quorum, call special meetings.

ARTICLE II.

QUORUM.

At any regular or special meeting nine members shall constitute a quorum.

ARTICLE III.

DUES.

Section 1. The dues of members shall be $2.00 per annum, $1.00 of same to apply to subscription for Club Journal, payable in advance, on or before the fourth Friday of September each year.

Sec. 2. Each member will be assessed $1.00 extra annually to provide light refreshments for each meeting.

Sec. 3. At the annual meeting members whose dues are unpaid shall be dropped from the roll after due notice mailed them at least thirty days previous.

Sec. 4. Members suspended for non-payment of dues shall not be reinstated until all arrearages have been paid.

Article IV.

ORDER OF BUSINESS.

1—Roll call.
2—Reading of the minutes.
3—Announcements of new members.
4—Reports of Committees.
5—Communications, notices, etc.
6—Unfinished business.
7—New business.
8—Recess.
9—Discussion of subjects presented at previous meeting.
10—Appointments of committees.
11—Election of officers.
12—Announcements.
13—Financial reports or statements.
14—Adjournment.

Article V.

SUBJECTS—PUBLICATIONS.

Section 1. The Executive Committee will provide the papers or matter for discussion at each regular meeting.

Sec. 2. The proceedings or such portion as the Executive Committee may approve shall be published (standard size, 6x9 inches), and mailed to the members of the Club or other similar clubs with which exchange is made.

Article VI.

The stenographic report of the meetings will be confined to resolutions, motions and discussions of papers unless otherwise directed by the presiding officer.

Article VII.

AMENDMENTS.

These By-Laws may be amended by written request of ten members, presented at a regular meeting, and a two-thirds vote of the members present at the next meeting.

List of Members.

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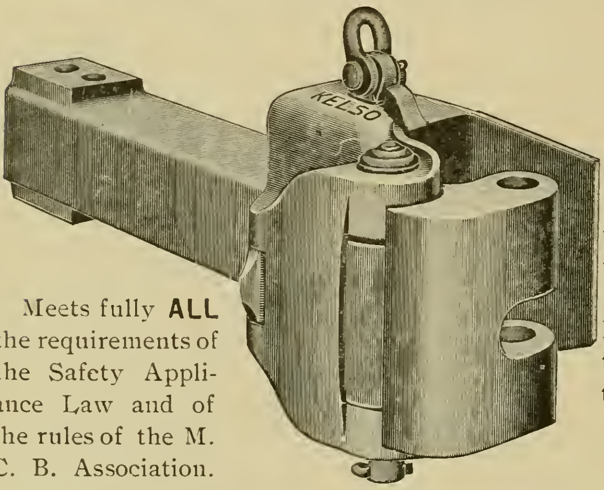

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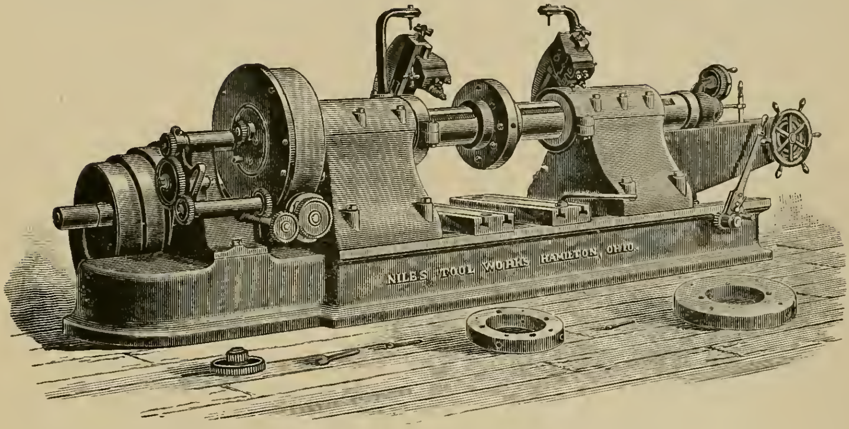
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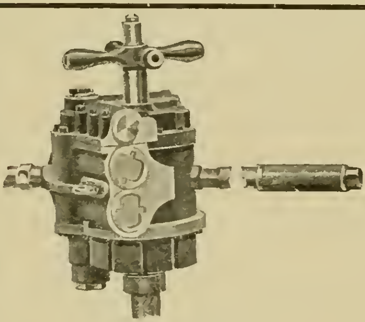

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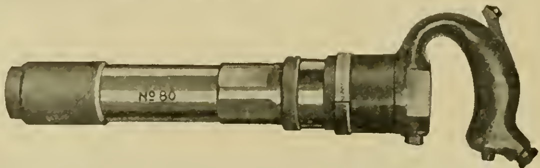

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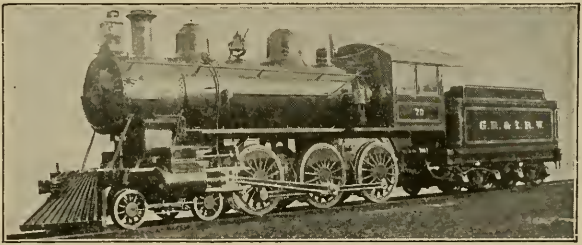

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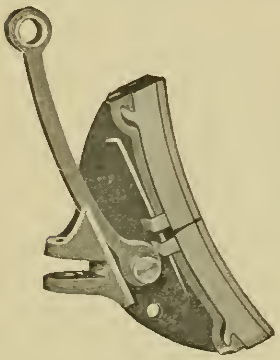

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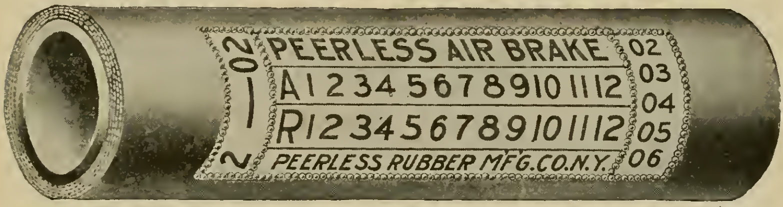
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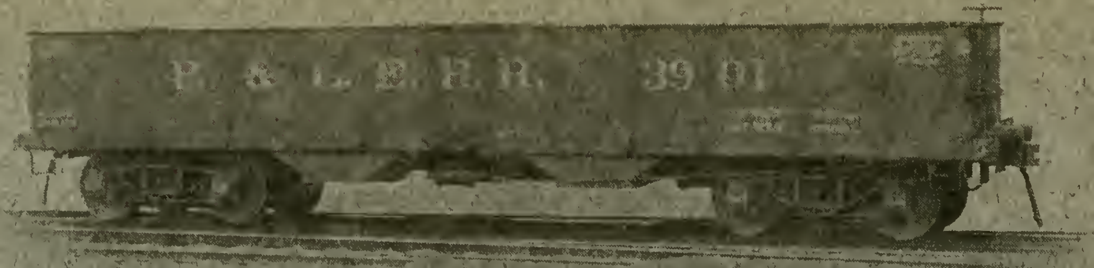

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